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ST. LUKE'S HOSPITAL

Medical and Surgical Reports

VOLUME I

For 1908 and 1909

EDITED FOR THE MEDICAL BOARD

BY

AUSTIN W. HOLLIS, M. D.

1909

SPECIAL

N. 1908/09

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PRESS OF
Stettiner Bros.
52-56 DUANE ST.
NEW YORK.

ERRATA

Chart on page 88 should follow on page 145; Article by Dr. Hollis.

Article on Gonorrhoeal Opthalmia by Dr. Cutler on pages 196-202, should be under Division of the Eye.

PRESS OF
Stettiner Bros.
52 58 DUANE ST.
NEW YORK.

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Assistant,

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In Surgery,

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In Clinical Pathology,

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In Medical Subjects,

Van Horne Norrie, M.D.
Samuel W. Lambert, M.D.

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INTRODUCTION

The publication of a medical and surgical report by St. Luke's Hospital has been made possible through the generosity of the late Margaret J. P. Graves, whose many gifts to medical institutions will long be remembered by our profession. About three years before her death she started a fund, as a nucleus, to be employed by the medical board of the hospital for scientific work. By the terms of her will she made that fund permanent by an endowment. The medical board has determined to use the interest of this fund to publish, if possible, an annual medical and surgical report in order to stimulate the scientific work of the hospital and to present to those interested in the hospital and in medicine a general summary of what is being done in the institution, which otherwise, as is the case at present, would lie forever buried.

The first volume is a modest one, some of the departments are not represented, but we hope larger experience and a better system will result in the production of a valuable medical publication.

Committee: { Austin W. Hollis, *Chairman*,
Charles L. Gibson,
Francis C. Wood.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
HEAD.						
A. Scalp.						
Lacerated wound of scalp	Suture (3). Dressings (1)	4	..	..	..	4
Lacerated wound scalp, dislocated clav. scap. jt.	Drainage scalp. Strapping shoulder (1)	...	1	..	..	1
Lacerated wound scalp, coal gas poisoning	.....	1	..	..	..	1
Cellulitis of scalp	.....	1	..	..	..	1
Carcinoma of scalp and inferior maxilla	Excision and curettement (1)	...	1	..	..	1
Epithelioma of scalp, face and hands.	Radium treatment (1)	...	1	..	..	1
Epithelioma of scalp	Excision with skin graft (1)	1	..	..	..	1
B. Skull.						
Fracture of the base of the skull, bruises, lacerations and contusions.	.....	...	..	..	1	1
Depressed fracture of the skull, hematoma of the forehead	Incision and drain (1)	...	1	..	..	1
Typhoid necrosis of skull with abscess	Excision of abscess sac. Curettement of bone (1)	1	..	..	..	1
Syphilitic necrosis of skull	Removal of dead tissue (1)	...	1	..	..	1
C. Brain and Membranes.						
Spina bifida with infection	Dressings 2, (1 died).	...	1	..	1	2
Chronic hydrocephalus (tubercular)	Trephining, sub-dural drainage of ventricles (1)	...	1	..	..	1
Birth palsy, phimosis	.....	...	..	1	..	1
Epilepsy	Removal of scar tissue from brain (1 died)	...	..	[1]1	1	2
Epilepsy, Jacksonian	Exploratory on skull and brain (1)	...	2	..	..	2
Epilepsy, traumatic	Craniotomy (1 died).	...	..	..	1	1
Concussion of brain	Exploratory craniotomy (1)	5	1	..	..	6
Sinus thrombosis from otitis media, septic pneumonia	Incision and drainage of lateral sinus, excision of jugular (1 died)	...	..	..	1	1

1 Left against advice.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
HEAD.—Continued.						
Cerebellar abscess, chronic otitis media	Exploratory craniotomy (1 died)	...	..	..	1	1
Capsular hemorrhage	Exploratory puncture of ventricles (1 died)	...	..	..	1	1
Tumor of ptuitary body	Exploratory craniotomy (1)	...	1	..	..	1
Brain tumor	Decompression operation (2)	1	1	..	2	4
D. FACE.						
(a) *Forehead.*						
Contusion of face	Wet dressings (1)	1	..	..	..	1
Angio-fibroma of forehead	Partial excision (1)	1	..	..	..	1
Lupus vulgaris, cicatricial contraction	Plastic on mouth and eye (1)	...	1	..	..	1
Lupus of face	Radium application (1)	...	1	[1]1	..	2
Dermoid cyst of forehead	Excision (1)	1	..	..	..	1
Epithelioma of temple	Radium treatment (1)	...	1	..	..	1
Carcinoma of forehead	Excision with skin-graft (1)	1	..	..	..	1
Carcinoma of forehead and orbit	Radium application (1)	...	1	..	..	1
(b) *Cheeks.*						
Cicatricial contraction of face from burns	Plastic operation (1)	...	1	..	..	1
Necrosis of malar bone	Curettement of bone (1)	1	..	..	..	1
Fracture of malar bone	Incision and manipulation of fragments (1)	1	..	..	..	1
Epithelioma of cheek and ear	Excision with skin-graft (1)	1	..	..	..	1
Epithelioma of face	Radium treatment (2)	...	2	..	..	2
Epithelioma of face and nose	Radium treatment (1)	...	1	..	..	1
Carcinoma of cheek	Excision with skin-graft (1)	1	..	..	..	1

1 Left against advice.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
HEAD.—Continued.						
(c) *Lips and Chin.*						
Hare lip	Plastic operation (1).	...	1	[1]1	..	2
Scars of hare lip operation	Plastic on lip and nose (1)	...	1	..	..	1
Deformity of lip	Plastic operation (4).	2	2	..	..	4
Epithelioma of lip	Radium application (1)	3	..	..	1	4
	Excision (1)	...	..	..	..	...
	Excision with plastic (1)	...	..	..	..	...
	Excision of tumor and glands of neck, plastic on lip (1 died).	...	..	..	..	...
E. NOSE.						
(a) *External.*						
Fracture of nasal bones	Set under ether (1)	...	1	..	..	1
Cicatrix on nose	Plastic operation (1).	1	..	..	..	1
Rhinophyma	Plastic operation (1).	...	1	..	..	1
Fibro-angio-sarcoma of nose	Ligation of right and left external carotids (1 died)	...	..	..	1	1
Tumor of nose	Excision with skin-graft (1)	1	..	..	..	1
Epithelioma of nose	Excision with skin-graft (1)	1	..	..	..	1
(b) *Internal.*						
Deviation of nasal septum	Submucous resection (25)	25	..	[2]1	..	26
Spicule of bone in nose	Excision (1)	1	..	..	..	1
Sarcoma of nose and accessory sinuses	.....	...	..	[2]1	..	1
Carcinoma of nasal septum, general carcinomatosis	Excision of growth (1 died)	...	..	..	1	1
(c) *Frontal and Other Sinuses.*						
Chronic frontal sinusitis	Incision, curettage and drainage (1)	1	..	..	..	1

1 Transferred to Medical Division.
2 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
HEAD.—Continued.						
F. Eyes.						
(a) *Eyelids.*						
Epithelioma of eyelid	Excision with skin-graft (1)	...	1	..	..	1
(b) *Conjunctiva.*						
Conjunctivitis	Local application (1)	...	1	..	..	1
(c) *Globe.*						
Internal strabismus	Tenotomy and advancement (2)	2	[1]1	..	..	3
Chronic glaucoma	.....	...	[2]1	..	..	1
Iritis	.....	...	[3]1	..	..	1
Irido-cyclitis	Iridectomy (1)	...	1	..	..	1
Acute purulent dacrocystitis, ulcers of cornea, panophthalmitis	Excision lachrymal cyst, ennucleation of eye ball (1)	1	..	..	..	1
Corneal ulcer	Excision (1)	...	1	..	..	1
Staphyloma of cornea	Excision (1)	3	..	..	..	3
	Ennucleation (2)	...	..	..	..	...
Cataract	Preliminary iridectomy (7)	6	6	..	..	12
	Excision of lens (3)	...	..	..	..	...
	Ennucleation of lens (1)	...	..	..	..	...
	Secondary removal (1)	...	..	..	..	...
New growth on cornea	Excision (1)	1	..	..	..	1
Tumor of choroid	Ennucleation (1)	1	..	..	..	1
Sarcoma of choroid	Ennucleation of eye ball (1)	1	..	..	..	1
(d) *Lachrymal Glands and Ducts.*						
Fistula of lachrymal cyst with necrosis of bone	.....	...	[4]2	..	..	2

1 Operated on in Out-Patient Department.
2 Medical treatment.
3 Not operated on.
4 Transferred to Out-Patient Department.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
HEAD.—Continued.						
(e) *Orbit.*						
Mucocele of orbit	Excision and drain (1)	1	..	..	..	1
Sarcoma of orbit	Excision (2)	1	1	..	..	2
Epithelioma of orbit	Excision (2)	2	1	..	..	3
	Excision with plastic and skin-graft (1).	...	..	..	..	...
G. Ears.						
(a) *Auricle and External Canal.*						
Otitis externa	Irrigation and wet dressings (1)	1	..	..	..	1
Epithelioma of ear	Radium treatment (1)	2	1	1	..	4
	Excision and plastic (3)	...	..	..	..	...
(b) *Tympanum and Middle Ear.*						
Syphilitic exudate of middle ear	.....	...	[1]1	..	..	1
Otitis media	Ossiculectomy (1)	3	[2]2	..	..	5
	Double paracentesis with drain (1)	...	..	..	..	...
	Irrigations (2)	...	..	..	..	...
Otitis media, mastoiditis	Local treatment (1)	1	..	..	..	1
Otitis media, mastoiditis, brain abscess	Radical mastoid, exploratory on brain (1 died)	...	..	..	1	1
Otitis media, sinus thrombosis	Radical mastoid, exploratory craniotomy (1)	1	..	..	..	1
(c) *Mastoid.*						
Acute mastoiditis	Radical operation (3)	2	1	..	..	3
Acute mastoiditis, abscess of shoulder	Radical mastoid, incision and drain of abscess (1)	...	1	..	..	1
Mastoiditis, abscess of cerebellum	Drainage of mastoid cells and abscess (1)	1	..	..	..	1
Mastoiditis, adenoids	Mastoid operation, curettage of adenoids (1)	1	..	..	..	1
Double mastoiditis	Double mastoid operation (2)	2	..	..	..	2

1 Medical treatment.
2 One case not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
HEAD.—Continued.						
H. Salivary Glands and Ducts.						
(a) *Parotid.*						
Cyst of parotid, lipoma of back	.....	...	..	[1]1	..	..1
Tumor of parotid	Radium treatment (1)	1	1	[1]1	..	3
	Excision (1).....	...	..	..	..	...
Sarcoma of parotid	Excision (1).....	1	..	..	..	1
(b) *Stenson's Duct.*						
(c) *Submaxillary Gland.*						
Submaxillary abscess, Ludwig's angina	Incision and drain (1)	1	..	..	..	1
Infected submaxillary gland	Local treatment (1)..	...	1	..	..	1
Recurrent carcinoma of submaxillary gland	.....	...	..	[1]1	..	1
(d) *Submaxillary Duct.*						
(e) *Sublingual Gland.*						
(f) *Sublingual Duct.*						
I. Mouth.						
(a) *General, Including Gums and Teeth.*						
Concealed molar	Excision (1).....	1	..	..	..	1
Cancrum oris	Local treatment (1)..	1	..	..	..	1
Stomatitis	.....	[1]1	..	..	..	1
Epulis	Excision (1).....	1	..	..	..	1
Carcinoma of the gum	Excision of the growth, dissection of the cervical nodes (1).....	1	..	..	..	1
(b) *Tongue.*						
Carcinoma of the tongue	Preliminary tracheotomy, excision of cervical nodes (1 died)	...	..	[1]1	1	2

1 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
HEAD.—Continued.						
(c) *Palate.*						
Cleft palate	Staphylorrhaphy, uranoplasty (2). Davis Collins operation (1).	...	3	..	..	3
Epithelioma of the hard palate	Excision (1)	1	..	..	..	1
J. Tonsils.						
Hypertrophied tonsils	Tonsilectomy (11)	8	3	..	..	11
Hypertrophied tonsils and adenoids	Adenectomy and tonsilectomy (44)	42	..	[1]2	..	44
Hypertrophied tonsils, elongated uvula, tongue tie	Tonsilectomy, excision of uvula, incision of frenum (1).	1	..	..	..	1
Tonsillitis	.....	[2]5	..	..	..	5
Peritonsillar abscess	Incision and drain (1)	1	[2]1	..	..	2
Sarcoma of the tonsil and cervical nodes	Excision (2)	...	2	..	..	2
Carcinoma of the throat and tonsil	.....	...	..	[3]1	..	1
K. Pharynx.						
Adenoids	Adenectomy (11)	11	..	..	..	11
Adenoids, subacute bronchitis	.....	...	..	[3]1	..	1
L. Superior Maxilla.						
(a) *Bone.*						
Fracture of superior maxilla, lacerated lip	.....	[3]1	..	..	..	1
Infected tooth socket	Extraction of tooth (1)	...	1	..	..	1
Alveolar abscess	Incision and drain (4)	1	3	..	..	4
Osteo-chondroma of upper jaw	Partial resection (1).	1	..	..	..	1
Epithelioma of upper jaw	Excision (2)	2	..	..	..	2
Carcinoma of superior maxilla	Resection (1)	1	1	[3]1	..	3
	Excision and plastic. (1)	...	..	..	..	...
Sarcoma of superior maxilla	Excision (3)	3	1	..	..	4
	Partial resection (1).	...	..	..	..	...

1 Left against advice.
2 Medical treatment.
3 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
HEAD.—Concluded.						
(b) *Antrum.*						
M. INFERIOR MAXILLA.						
Persistent sinus	.....	...	[1]1	..	..	1
Fractured jaw, lacerated face	Local treatment (2)..	2	1	..	..	3
	Splints (1)	...	..	..	..	
Fractured jaw, cellulitis of neck	Incision and drain (1)	...	1	..	..	1
Necrosis of inferior maxilla	Incision and drain (1)	1	..	..	..	1
Osteomyelitis of jaw	Sequestrectomy with drain (1).....	1	..	..	..	1
Epithelioma of lower jaw	Excision of tumor (1)	2	..	..	..	2
Sarcoma of lower jaw	Excision of half of jaw (1)	...	..	[2]1	..	1
Totals Head:	Total....	182	69	17	14	282
Cases .....282 Died....14						
Operations .....220 Died....12						
NECK.						
Thickened scar in neck	.....	...	..	[1]1	..	1
Persistent cervical sinus	Excision (1).....	1	..	..	..	1
Burns of neck	Skin grafting (1)....	1	..	..	..	1
Carbuncle of neck	Excision with skin graft (1)	5	..	..	1	6
	Excision (4, 1 died)..	...	..	..	..	
	Dressing (1)	...	..	..	..	
Cellulitis of neck	Incision and drain (11)	8	3	..	..	11
Cellulitis of neck, œdema of larynx...	Incision and drain (1 died).....	...	..	..	1	1
Tubercular abscess of neck	Incision and drain (6, 1 died).....	4	1	..	[3]1	6
Tubercular abscess of neck, otitis media	Incision and drain paracentesis (1)....	1	..	..	..	1
Enlarged cervical glands, blepharitis..	.....	...	[4]1	..	..	1
Tubercular cervical adenitis	Excision (22)	25	3	[3]3	..	31
	Incision, curettage and drain (5).....	...	..	..	..	
	Local treatment (1).	...	..	..	..	
Tubercular cervical adenitis, pulmonary tuberculosis	.....	...	[4]1	..	..	1

1 Not operated on.
2 Left against advice.
3 Marasmus.
4 Medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
NECK—Continued.						
Tubercular cervical adenitis, endometritis	Dissection of glands, curettage (1).	1	..	..	..	1
Tubercular cervical adenitis, adenoids, vesical calculus, cystitis	Incision and drain, adenectomy, bladder irrigation (1).	...	1	..	..	1
Tubercular and epitheliomatous glands of the neck	.....	...	[1]1	..	..	1
Tumor of the neck	.....	...	..	[2]1	..	1
Lipoma of the neck	Excision (2)	2	..	..	..	2
Epitheliomatous glands of the neck	Excision (1)	...	1	..	..	1
Carcinomatous glands of the neck	Excision (5)	4	[2]1	..	..	5
Sarcoma of the neck	Excision and dissection (1)	1	..	..	..	1
Lympho-sarcoma of the neck	.....	...	..	[1]1	..	1
LARYNX AND TRACHEA.						
Tubercular laryngitis	.....	...	..	[3]1	..	1
Papilloma of the larynx	.....	...	..	..	[1]1	1
Epithelioma of the throat	.....	...	..	[3]1	..	1
Epithelioma of the larynx	Laryngectomy (1)	1	..	..	..	1
ŒSOPHAGUS.						
Spasmodic stricture of the œsophagus	.....	...	[3]1	..	..	1
Stricture of the œsophagus	Gastrostomy (1)	...	[4]3	..	..	3
Cicatricial contraction of the œsophagus	Gastrostomy with string cutting, dilatation with bougies (1).	1	..	..	..	1
Tumor of the œsophagus	Tracheotomy (1 died)	...	..	..	1	1
Carcinoma of the œsophagus	Gastrostomy (1)	...	..	1	[5]2	3
	Dilatation with bougies (1)	...	..	..	..	
THYROID GLAND.						
Goitre	Excision of right lobe and isthmus (2)	2	..	..	..	2
Cyst of thyroid	Partial thyroidectomy (3)	5	..	..	..	5
	Ennucleation (1)	...	..	..	..	
	Incision, curettage and drain (1)	...	..	..	..	

1 Not operated on.
2 Left against advice.
3 Medical treatment.
4 Two cases medical treatment.
5 One case medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
NECK.—Concluded.						
Exophthalmic goitre	Insertion of radium (3)	3	3	[1]1	..	7
	Partial thyroidectomy (3)	...	..	..	..	...
	General treatment (1)	...	..	..	..	...
Total Neck: Cases .....102 Died....7 Operations ..... 80 Died....5	Total.....	65	20	10	7	102
THORAX.						
A. Chest Wall.						
(a) *Ribs and Sternum.*						
Fractured ribs	.....	[2]5	..	..	..	5
Cold abscess of rib	Incision (1).....	1	..	..	..	1
(b) *Soft Parts.*						
Contusion of chest	Dressings (2).....	2	..	..	..	2
Contusion of thorax, pneumonia.....	.....	...	..	..	[2]1	1
Ulcer on chest	Skin grafting (2)....	1	1	..	..	2
Lipoma chest wall	Exploratory laparotomy (1).....	2	..	..	..	2
	Excision (1).....	...	..	..	..	...
Fibro-myoma of chest wall.....	Excision (1).....	1	..	..	..	1
Fibro-sarcoma of chest wall.....	Excision of ribs (1)..	...	1	..	..	1
Carcinoma below the clavicle	Excision of growth (1)	1	..	..	..	1
B. Mamma.						
Abscess of breast	Incision and drain (3)	2	1	..	..	3
Double mastitis	Incision and drain (1)	1	..	..	..	1
Mastitis	Local treatment (1)..	1	1	..	..	2
	Amputation of breast with incision and drain (1).....	...	..	..	..	...
Chronic cystic mastitis	Excision of growth (1)	3	..	..	..	3
	Excision of both breasts (1).....	...	..	..	..	...
	Amputation with axillary dissection (1).	...	..	..	..	...
Ulcer of breast	Skin grafting (1)....	1	..	..	..	1

1 Left against advice.
2 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
THORAX.—Concluded.						
TUMORS.						
Cyst of breast	Tapping (1)	1	..	..	..	1
Cyst adenoma of breast	Excision (3)	6	..	..	..	6
	Amputation of breast (3)	...	..	..	..	...
Fibroma of breast	Excision (2)	2	..	..	..	2
Fibro-adenoma of breast	Excision (7)	11	..	..	..	11
	Complete amputation (4)	...	..	..	..	...
Carcinoma of breast	Complete amputation (29)	27	2	[1]3	..	32
Carcinoma of both breasts	Complete amputation right breast, partial dissection left (1)	...	1	..	..	1
Carcinomatous node of breast	Excision (1)	1	..	..	..	1
Carcinoma of breast and nodes, secondary carcinoma of liver	Complete amputation with skin graft (1)	...	1	..	..	1
Sarcoma of breast	Complete amputation (1)	1	1	..	..	2
	Local treatment (1)	...	..	..	..	...
C. LUNGS AND BRONCHI.						
Foreign body in left bronchus	Tracheotomy (1)	...	..	1	..	1
PLEURA.						
Empyema	Incision and drain (4)	[2]8	[2]4	..	..	12
	Incision and drain with excision of ribs (5)	...	..	..	..	...
	Aspiration and injection of formalin (1)	...	..	..	..	...
D. HEART.						
E. PERICARDIUM.						
Purulent pericarditis	Incision and drain (1)	1	..	..	..	1
F. MEDIASTINUM.						
Thorax Total: Cases .....97 Died....1 Operations .....82 Died....0	Total.....	79	13	4	1	97

1 Not operated on.
2 One case medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
BACK.						
GENERAL.						
Strain of muscles of back, traumatic neurosis		[1]1	..	..	..	1
Contusion of back	Massage (2)	[1]2	..	..	..	2
Sacral teratoma	Excision (1)	1	..	..	..	1
Lipoma of back	Enucleation (1)	1	..	..	..	1
Carcinoma of back	Excision with skin graft (1)	1	..	..	..	1
Sarcoma of back	Excision with skin graft (1)	...	1	..	..	1
SPINE.						
Coccygodynia	Coccygectomy (2)	2	..	..	..	2
Pott's disease of the spine	Orthopedic treatment (2)	...	[2]3	..	..	3
Fracture of the spine (inoperable)		...	[2]1	..	..	1
Sacro-coccygeal cyst	Excision (1)	1	..	..	..	1
Sacro-coccygeal cyst, varicocele	Excision; excision of veins (1)	1	..	..	..	1
SPINAL CORD AND MEMBRANES.						
Tumor of spinal cord	Laminectomy with excision of tumor (1 died)	...	..	..	1	1
Hemorrhage into spinal cord	Lumbar puncture (1)	1	..	..	..	1
Back Totals: Cases .....17 Died....1 Operations .....10 Died....1	Total.....	11	5	0	1	17
ABDOMEN.						
(a) *Abdominal Wall.*						
Cellulitis of abdominal wall	Incision and drain (1)	2	..	..	..	2
	Local treatment (1)	...	..	..	..	...
Tubercular abdominal sinus from drained ovarian cyst	Dissection of sinus (1)	1	..	..	..	1
Lipoma of abdominal wall	Excision (1)	1	..	..	..	1

1 Medical treatment.
2 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
ABDOMEN.—Continued.						
HERNIA.						
(a) *Ventral.*						
Ventral hernia	Herniotomy (16)	16	..	[1]1	..	17
Ventral and inguinal hernias	Double herniotomy (1)	1	..	..	..	1
Ventral hernia, bronchitis	.....	...	[2]1	..	..	1
Ventral hernia, hemorrhoids, fissure in ano	Herniotomy, ligation and removal of hemorrhoids, dilatation of sphincter (1)	1	..	..	..	1
Ventral hernia, general peritonitis (cause unknown)	Laparotomy with drain (1)	1	..	..	..	1
Ventral hernia and fistula in appendix scar	Revision of scar, closure of fistula (1)	1	..	..	..	1
Hernia and adhesions about cæcum	Herniotomy, separation of adhesions (1)	1	..	..	..	1
(b) *Umbilical.*						
Umbilical hernia	Herniotomy (2)	2	..	..	..	2
Umbilical and inguinal hernias	Herniotomy (1)	1	..	..	..	1
(c) *Inguinal.*						
Strangulated inguinal hernia	Resection of intestines (2) (1 died)	1	..	..	1	2
Strangulated inguinal hernia, containing right tube and ovary	Right salpingo-oophorectomy and herniotomy (1)	1	..	..	..	1
Inguinal hernia	Bassini (65)	73	..	[3]5	..	78
	Bassini Barker (7)	...	..	..	..	...
	Halstead (1)	...	..	..	..	...
Double inguinal hernia	Double Bassini (20)	20	..	..	..	20
Inguinal hernia, varicocele	Bassini, excision of veins (1)	1	..	..	..	1
Inguinal hernia, undescended testicle	Bassini, anchoring testicle in scrotum (2)	2	..	..	..	2
Inguinal hernia, undescended testicle, phimosis	Bassini, anchoring testicle in abdomen, circumcision (1)	1	..	..	..	1

1 To Division A.
2 Medical treatment.
3 Left against advice.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
ABDOMEN.—Continued.						
Inguinal hernia, hydrocele of cord....	Bassini, excision of sac (2).....	4	..	..	..	4
	Bassini, plastic on cord (1).....	...	..	..	..	...
	Bassini, bottle operation for hydrocele (1)	...	..	..	..	...
Inguinal hernia, chr. appendix.....	Bassini, appendectomy (2)	2	..	..	..	2
Inguinal hernia, visceroptosis.....	Herniotomy, nephropexy (1).....	1	..	..	..	1
Recurrent inguinal hernia	Plastic operation (1).	1	..	..	..	1
Inguinal hernia, cellulitis of abdominal wall	Bassini, incision and drain (1).....	1	..	..	..	1
(d) *Femoral.*						
Strangulated femoral hernia	Herniotomy with laparotomy (1).....	1	..	..	..	1
Strangulated femoral hernia, pulmonary embolus	Herniotomy, resection of gut (1 died).....	...	..	..	1	1
Femoral hernia	Herniotomy (6).....	6	..	..	..	6
PERITONEUM.						
Abdominal adhesions	Breaking up of adhesions (4)	3	1	[1]1	..	5
General peritonitis	Incision and drain, posterior colpotomy (1)	...	1	..	..	1
Tubercular peritonitis	Laparotomy (2)	...	2	[1]1	..	3
Tubercular peritonitis, tabes mesenterica, acute general miliary tuberculosis	.....	...	..	..	[2]1	1
Sub-diaphragmatic abscess	Incision and drain (1 died).....	...	..	..	1	1
Tubercular retroperitoneal lymph nodes	Exploratory laparotomy (1).....	...	..	1	..	1
STOMACH.						
Neurosis of stomach	Exploratory laparotomy (2)	[2]1	2	..	..	3
Hyperchlorhydria	.....	...	[2]2	..	..	2

1 Not operated on.
2 Medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
ABDOMEN.—Continued.						
Chronic gastritis	Exploratory laparotomy (1)	1	..	..	..	1
Acute alcoholic gastritis	.....	[1]1	..	..	..	1
Gastro-enteritis	.....	...	..	[1]1	..	1
Gastric ulcer	Gastro-enterostomy (4)	7	..	..	..	7
	Gastrotomy (2)	...	..	..	..	...
	Finney operation (1)	...	..	..	..	...
Perforated gastric ulcer, general peritonitis	Gastrostomy, gastrorrhaphy (1 died)	...	..	..	1	1
Carcinoma of the stomach	Exploratory laparotomy (3)	...	[2]4	[3]6	2	12
	Posterior gastro-enterostomy (3) (2 died)	...	..	..	..	...
	Jejunostomy (1)	...	..	..	..	...
Carcinoma of the stomach, abdominal adhesions	Anterior gastro-enterostomy, entero-enterostomy, separation of adhesions (1)	...	..	1	..	1
Carcinoma of the stomach, spleen and liver	.....	...	..	..	[1]1	1
Carcinoma of the stomach and ovary	.....	...	..	[4]1	..	1
INTESTINES.						
Traumatic rupture of jejunum	Enterorrhaphy (1)	1	..	..	..	1
Perforation of small intestines (stab wound)	Enterorrhaphy (1)	1	..	..	..	1
Typhoid perforation	Suture of gut (1)	1	..	..	..	1
Fecal fistula, adhesions of intestines	Incision and drain, resection of gut with inversion of holes (1)	1	..	..	..	1
Duodenal ulcer	.....	...	[1]1	..	..	1
Dysenteric ulceration of sigmoid, general peritonitis	.....	...	..	..	[4]1	1
Carcinoma of the cæcum	Resection of the caput coli, lateral anastomosis (1 died)	...	..	..	1	1
Carcinoma of the ascending colon, intestinal obstruction	Colostomy (1 died)	...	..	..	1	1

1 Medical treatment.
2 Two cases medical treatment.
3 Two cases medical treatment; one left against advice.
4 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
ABDOMEN.—Continued.						
Carcinoma of the colon	Resection of the gut (1)	1	..	..	..	1
Carcinoma of the sigmoid	Left ileocolostomy (1)	...	1	[1]1	..	1
VERMIFORM APPENDIX.						
(a) *Acute Catarrhal Inflammation.*	*See Note	[2]12	1	..	..	13
(b) *Acute Suppurative Inflammation.*		9	..	..	..	9
Acute suppurative inflammation with spreading peritonitis		4	..	..	..	4
Acute suppurative inflammation with general septicæmia		...	..	..	1	1
Acute suppurative inflammation with hemorrhagic ovarian cyst	Appendectomy with drain, oophorectomy (1)	1	..	..	..	1
(c) *Acute Gangrenous Inflammation.*		22	..	..	3	25
Acute gangrenous inflammation with perforation		2	..	..	..	2
Acute gangrenous inflammation with spreading peritonitis		7	..	..	[3]8	15
Acute gangrenous inflammation with general peritonitis, intestinal obstruction with abscess, inflammation of Maeckel's diverticulum	Appendectomy with drain, multiple incisions, lateral anastomosis, inversion of Maeckel's diverticulum (1).	1	..	..	..	1
(d) *Perforative Appendicitis.*		6	..	..	..	6
(e) *Appendicitis with Abscess.*		33	1	..	1	35
Appendicitis with abscess and intestinal obstruction		...	..	..	1	1
(f) *Appendicitis with General Peritonitis.*		...	..	..	[4]2	2
Appendicitis with general peritonitis and broncho-pneumonia		...	..	..	1	1
(g) *Sub-acute Inflammation.*		22	[2]2	..	..	24
Sub-acute inflammation with pregnancy		...	[1]1	..	..	1
Sub-acute inflammation with intestinal obstruction		1	..	..	..	1
(h) *Chronic Inflammation.*		90	[5]2	[6]3	[7]1	96
Chronic appendicitis, redundant foreskin	Appendectomy, circumcision (1)	1	..	..	..	1

1 Not operated on.
2 Two cases medical treatment.
3 One case pulmonary embolus.
4 One case not operated on.
5 One case left against advice; one case medical treatment.
6 Two cases left against advice; one case not operated on.
7 Pulmonary embolus.

* NOTE.—For operations on appendix see next page.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
ABDOMEN.—Continued.						
Chronic appendicitis, endometritis, hemorrhoids	Appendectomy, curettage, clamp and cautery (1)	1	..	..	..	1
Chronic appendicitis, endometritis	Appendectomy, curettage (2)	2	..	..	..	2
Chronic appendicitis, endometris, cervical polyp	Appendectomy, curettage, excision of polyp (1)	1	..	..	..	1
Chronic appendicitis, stenosis of cervix	Appendectomy, dilatation, curettage (1).	1	..	..	..	1
Chronic appendicitis, cystic ovary	Appendectomy, plastic on ovary (1)	1	..	..	..	1
Chronic appendicitis, cystic ovary, retroversion	Appendectomy, oophorectomy, ventral suspension (1)	1	..	..	..	1
Chronic appendicitis, umbilical hernia	Appendectomy, plastic for hernia (1)	1	..	..	..	1
Chronic appendicitis, adhesions about cæcum	Exploratory laparotomy, breaking up of adhesions (1)	...	1	..	..	1
Chronic appendicitis, floating right kidney	Appendectomy, nephrorrhaphy (2)	2	..	..	..	2
Chronic appendicitis, floating right kidney, uræmia	Appendectomy, nephropexy (1 died)	...	..	..	1	1
Chronic appendicitis, acute suppurative nephritis	Appendectomy (1)	1	..	..	..	1
		383	23	22	30	458
	Operations on Appendix:					
	Appendectomy (no drain, non-infected cases), (125, 1 died)	123	1	..	[1]1	125
	Appendectomy (no drain, infected cases) (3)	3	..	..	..	3
	Appendectomy with drainage, (85, 14 died)	71	..	..	14	85
	Appendix not removed, drain, (16, 3 died)	12	1	..	3	16

Total Cases Appendicitis.....252
Died.....19
Operations on Appendix 245
Died.....19

1 Pulmonary embolus.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
ABDOMEN.—Continued.						
INTESTINAL OBSTRUCTION.						
1. *Acute and Subacute.*						
Adhesions	Breaking up of adhesions (3, 2 died).	1	..	..	2	3
Strictures, unknown cause	Ileostomy (1 died)	...	..	..	1	1
Meckel's diverticulum	Freeing band, lateral anastomosis (1)	[1]	..	..	..	1
Ileo-colic intussusception, general peritonitis		...	..	..	[1]1	1
Intussusception	Laparotomy and reduction (3, 1 died).	2	..	..	1	3
Double intussusception	Laparotomy and reduction (1)	1	..	..	..	1
Enterolith	Enterotomy (3, 1 died)	2	..	..	1	3
2. *Chronic.*						
Adhesions to stomach	Separation of adhesions, gastrorrhaphy (1)	1	..	..	..	1
Adhesions in upper abdomen	Exploratory laparotomy, breaking up of adhesions (1)	1	..	..	..	1
Aneurism of abdominal aorta	Exploratory laparotomy (1 died)	...	..	..	1	1
Acute diverticulitis, endometritis, urethral caruncle	Curettage, excision of caruncle (1)	...	1	..	..	1
Liver.						
Abscess of the liver	Exploratory laparotomy, transpleural drain (1)	1	..	..	..	1
Carcinoma of the liver		...	..	[2]1	[2]1	2
Cirrhosis of the liver	Omentopexy (2)	...	..	2	..	2
Gall Bladder and Ducts.						
Adhesions about gall bladder	Separation of adhesions, cholecystotomy (1)	1	..	..	..	1
Cholecystitis	Cholecystectomy (1). local and general treatment (1)	2	[1]1	..	[2]1	4

1 Not operated on.
2 Medical treatment

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
ABDOMEN.—Concluded.						
Cholecystitis with cholangitis	Cholecystectomy (1 (died)	...	..	..	1	1
Cholelithiasis	Cholecystectomy (2).	3	[1]3	[2]3	..	9
	Cholecystectomy with drain (1)	...	..	..	..	...
Cholelithiasis, endocarditis		...	[1]1	..	..	1
Cholelithiasis, empyema of gall bladder, cholemia	Cholecystotomy (1 died)	...	..	..	1	1
Cholelithiasis, empyema of gall bladder, enlarged right kidney	Cholecystectomy (1)..	1	..	..	..	1
Cholelithiasis, cholemia, pneumonia	Cholecystotomy (1 died)	...	..	..	1	1
Cholelithiasis, septic cholecystitis and cholangitis	Cholecystotomy with drain (1 died)	...	..	..	1	1
Cholelithiasis, chronic nephritis, diabetes		...	..	[2]1	..	1
Pancreas.						
Acute hemorrhagic pancreatitis	Laparotomy and drain (2 died)	...	..	..	2	2
Sub-acute hemorrhagic pancreatitis	Laparotomy and drain (1)	1	..	..	..	1
Carcinoma of pancreas and liver	Cholecystenterostomy (2)	...	2	..	..	2
Spleen.						
Cyst of spleen	Splenectomy (1)	1	..	..	..	1
Omentum.						
Carcinoma of omentum		...	..	[2]1	..	1
Mesentery.						
Total Abdomen: Cases .....508 Died....45 Operations .....460 Died....39	Total	402	31	30	45	508
PELVIS.						
Rectum.						
Stricture of rectum	Posterior proctotomy (1)	...	2	[2]1	..	3
	Bougies (1)	...	..	..	..	...

1 Medical treatment.
2 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
PELVIS.—Continued.						
Rectal tenesmus	Dilatation of sphincter (1)	1	..	..	..	1
Peri-rectal abscess	Incision and drain (1)	1	..	..	..	1
Peri-rectal abscess, broncho-pneumonia	Incision and drain exploratory laparotomy (1 died)	...	..	..	1	1
Ulcerative proctitis	Local treatment (1)	...	..	1	..	1
Carcinoma of rectum	Left inguinal colostomy, (3, 1 died)	...	[1]4	[2]3	3	10
	Kraske operation (1 died)	...	..	..	..	...
	Perineal excision (1)	...	..	..	..	...
	By-pan anastomosis (1 died)	...	..	..	..	...
Recto-vesical fistula	.....	...	..	[3]2	..	2
Anus.						
Imperforate anus	Left inguinal colostomy (1 died)	...	..	..	2	2
	Formation of complete artificial anus (1 died)	...	..	..	..	...
Fissure in ano	Dilatation of sphincter (9)	9	1	..	..	10
	Excision (1)	...	..	..	..	...
Hemorrhoids	Clamp and cautery (33)	37	[4]3	[3]3	..	43
	Whitehead operation (4)	...	..	..	..	...
	Excision (3)	...	..	..	..	...
Hemorrhoids, menorrhagia	Clamp and cautery, curettage (1)	1	..	..	..	1
Hemorrhoids, contraction of Tendo Achilles	Clamp and cautery, tenotomy (1)	1	..	..	..	1
Hemorrhoids, fissure in ano	Clamp and cautery, dilatation of sphincter (2)	2	..	..	..	2
Hemorrhoids, pulmonary tuberculosis.	.....	...	[5]1	..	..	1
Hemorrhoids, prolapse of the rectum, senile dementia	Whitehead operation (1)	1	..	..	..	1
Hemorrhoids, hydrocele	Clamp and cautery, excision (1)	1	..	..	..	1

1 One case not operated on.
2 Not operated on.
3 Left against advice.
4 One case left against advice.
5 Medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
PELVIS.—Concluded.						
Fistula in ano	Incision of sphincter and drain (20)	18	2	[1]1	..	21
Fistula in ano, stricture of rectum	Incision and drain, proctotomy (1)	1	..	..	..	1
Ischio-rectal abscess	Incision and drain, (18, 1 died)	16	1	..	[2]1	18
Ischio-rectal abscess, hemorrhoids	Incision and drain, clamp and cautery (1)	1	..	..	..	1
Ischio-rectal sinus	Dressings (1)	...	[1]1	..	..	1
Ischio-rectal sinus, pulmonary tuberculosis	.....	...	..	[1]1	..	1
Perineal cellulitis	Wet dressings (1)	[1]1	..	..	..	1
Hypernephroma of ischio-rectal fossa	Partial excision (1)	...	1	..	..	1
Contusion of buttock, synovitis of knee	Local treatment (1)	....	1	..	..	1
Total Pelvis: Cases .....127 Died....7 Operations .....110 Died....7	Total	91	17	12	7	127
EXTREMITIES.						
Upper Extremity.						
(a) *Axilla.*						
Axillary folliculitis	Incision and drain (3)	2	1	..	..	3
Nodes in axilla	Excision (1)	1	..	..	..	1
Recurrent carcinomatous glands in axilla	Excision (2)	1	1	..	..	2
(b) *Shoulder.*						
Abscess of shoulder	Incision and drain (1)	1	..	..	..	1
(c) *Arm.*						
Cellulitis of hand and arm	Incision and drain (3)	[3]4	..	..	..	4

1 Not operated on.
2 Cerebral embolus.
3 One case not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
EXTREMITIES.—Continued.						
Osteomyelitis of hand and arm	Incision, curettage and drain (1)	1	..	..	..	1
(d) *Elbow.*						
(e) *Forearm.*						
Tuberculosis of forearm	Partial excision and drain (1)	...	1	..	..	1
Epithelioma of forearm	Excision with skin grafting (1)	1	..	..	..	1
(f) *Wrist.*						
Sprained wrist	Splints (1)	...	1	..	..	1
Tuberculosis of wrist	Incision, excision and drain (1)	...	1	..	..	1
Tumor of wrist	Excision (1)	1	..	..	..	1
(g) *Hand and Fingers.*						
Dupuytren's contraction	Excision of palmar fascia (1)	1	..	..	..	1
Lacerated wound of hand, acute alcoholism	Dressings (1)	...	1	..	..	1
Lacerated hand, fractured fingers	.....	...	1	..	..	1
Cellulitis of hand	Incision and drain (4)	4	[1]2	..	..	6
	Local treatment (1)	...	..	..	..	...
Traumatic amputation of fingers	Plastic on hand (1)	1	..	..	..	1
Epithelioma of back of hand	Excision with skin graft (1)	1	..	..	..	1
LOWER EXTREMITY.						
(a) *Groin.*						
Inguinal adenitis	Incision and drain (4)	7	2	..	[2]1	10
	Dissection of glands (4, 1 died)	...	..	..	..	...
	Local treatment (2)	...	..	..	..	...
Femoral adenitis	Incision and drain (1)	1	1	..	..	2
	Application of Bier cups (1)	...	..	..	..	...

1 One case transferred to Bellevue Hospital; erysipelas.
2 Septic pneumonia.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
EXTREMITIES.—Continued.						
Tubercular femoral glands	Dissection of glands (1)	1	..	..	..	1
Sarcoma of femoral and inguinal lymph nodes	Dissection of glands (1)	...	..	1	..	1
(b) *Thigh.*						
Contusion of hip	Local treatment (1)	...	1	..	..	1
Hematoma of thigh	Incision and drain (2)	2	..	..	..	2
Dog bites of thigh and leg	Cauterization (1)	1	..	..	..	1
Lacerated wound of thigh and perineum	Incision and drain (1)	1	..	..	..	1
Popliteal abscess	Incision and drain (1)	1	..	..	..	1
Cold abscess of thigh	Incision and drain (5)	2	4	..	..	6
	Aspiration, Buck's extension, plaster bandage (1)	...	..	..	..	...
Cold abscess of hip, pulmonary tuberculosis		...	..	[1]1	..	1
Tubercular abscess of hip, Pott's disease	Incision and drain (1)	1	..	..	..	1
Tubercular abscess of hip, chronic endocarditis	Dressings (1)	...	..	1	..	1
(c) *Knee.*						
(d) *Leg.*						
Contraction of tendo Achilles	Tenoplasty (1)	...	1	..	..	1
Contusion of leg		[1]1	..	..	..	1
Needle in leg	Incision and removal (1)	1	..	1	..	2
	Incision (1)	...	..	..	..	...
Bullet in leg	Excision (1)	1	..	..	..	1
Cellulitis of leg	Incision and drain (3)	4	1	..	..	5
	Wet dressings (2)	...	..	..	..	...

1 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
EXTREMITIES.—Continued.						
Abscess of leg with gangrene of neel, uræmia	Incision and drain 1 died)	...	..	..	1	1
Periphlebitis of leg	Incision and drain (1)	...	1	..	..	1
Ulcer of leg	Skin grafting (1)	...	1	[1]1	..	2
Ulcers of legs, contractions and ankyloses of joints	Dressings (1)	...	1	..	..	1
(e) *Ankle.*						
Sub-luxation of ankle	Plaster cast and rest (1)	1	..	..	..	1
Trauma of ankle and foot	Local treatment (1)	1	..	..	..	1
Cellulitis of ankle	Local treatment (1)	1	..	..	..	1
(f) *Foot and Toes.*						
Talipes equino varus	Division of tendo Achilles and plantar fascia (1)	...	1	..	..	1
Ingrowing toe nail	Radical operation (1)	2	..	..	..	2
	Partial excision of nail (1)	...	..	..	..	...
Contusion of foot	Local treatment (2)	2	..	..	..	2
Burns of foot	Dry treatment (1)	1	..	..	..	1
Wounds of foot with severed tendon	Tenorrhaphy (1)	1	..	..	..	1
Frost bite of toes with infection	Baking operation (1)	...	1	..	..	1
Perforating ulcer of foot	Excision of metatarso-phalangeal joint (1)	1	..	..	..	1
Gangrene of foot (arterio-sclerosis)	Local treatment (2)	...	1	[2]1	..	2
Gangrene of toes (diabetic)	Dressings (1)	...	1	..	..	1
Tuberculosis of foot, pulmonary tuberculosis	.....	...	..	[1]1	..	1
Infected foot	Incision and drain, (6, 1 died)	6	2	[3]1	1	10
	Local treatment (1)	...	..	..	..	...
	Baking (2)	...	..	..	..	...
Infected heel	Local treatment (1)	...	1	..	..	1
Infected great toe	Excision of interphalangeal joint (1)	...	1	..	..	1
Osteomyelitis of great toe	Excision of last interphalangeal joint (1)	...	1	..	..	1

1 Not operated on.
2 Transferred to Bellevue Hospital.
3 Left against advice.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
EXTREMITIES.—Concluded.						
Epithelioma of sole of foot	Excision with skin grafting (2)	1	1	..	..	2
Epithelioma of foot, glands in groin	Disarticulation at knee joint, excision of glands (1)	1	..	..	..	1
Osteoma of foot	Removal (1)	1	..	..	..	1
Papilloma of sole of foot	Excision with skin-graft (1)	1	..	..	..	1
Total Extremities:						
Cases .....106 Died....3 Operations ..... 72 Died....3	Total	62	33	8	3	106
URINARY SYSTEM.						
Kidney.						
Nephroptosis	Nephropexy (3)	3	..	..	..	3
Double nephroptosis	Double nephropexy (1)	1	..	..	..	1
Perinephritic cyst, abdominal carcinoma	Tapping cyst (1)	...	1	..	..	1
Double perinephritic abscess	Incision and drain (1 died)	...	..	..	1	1
Pyelitis	.....	[1]1	[1]1	[1]1	..	3
Pyonephrosis	Nephrectomy (2)	2	..	..	..	2
Renal calculus	Nephrotomy (2)	1	[2]3	..	..	4
Ureter.						
Kink in ureter, abdominal adhesions	Exploratory nephrotomy, exploratory laparotomy (1).	1	..	..	..	1
Calculus in ureter	Incision and removal (1)	1	..	..	..	1
Bladder.						
Extrophy of the bladder	Isolation of loop of intestine for later operation (1). Local treatment (1)	...	2	..	..	2

1 Medical treatment.
2 Two cases medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
URINARY SYSTEM.—Continued.						
Extrophy of the bladder, perinephritic abscess	Incision and drain (1)	...	1	..	..	1
Vesico-vaginal fistula, chronic cystitis.	Sim's operation (1)	1	..	..	..	1
Cystitis	Irrigation and medical treatment (4)	[1]5	4	[2]2	..	11
	External urethrotomy and local treatment (1)	...	..	..	..	
	Cystoscopy and endoscopy (1)	...	..	..	..	
Tubercular cystitis		...	[3]2	..	..	2
Gonorrheal cystitis	Exploratory laparotomy, irrigation (1)	1	..	..	..	1
Cystitis and pyelitis	Bladder irrigation (1)	...	1	..	..	1
Perivesical abscess	Incision and drain (1)	...	1	..	..	1
Foreign body in the bladder	Removal (1)	1	..	..	..	1
Carcinoma of the bladder	Suprapubic cystotomy (1)	...	1	[4]3	..	4
	Exploratory laparotomy (1)	...	..	..	..	
Urethra.						
Stricture of the urethra	External urethrotomy (2)	12	[5]3	1	[6]1	17
	Internal urethrotomy (1)	...	..	..	..	
	External and internal urethrotomy (12, 1 died)	...	..	..	..	
	Passing sounds (1)	...	..	..	..	
Stricture of the urethra, hemorrhoids.	External and internal urethrotomy, clamp and cautery (1).	1	..	..	..	1
Hypospadias	Plastic operation (6).	...	6	..	..	6
Urethral caruncle	Excision (1)	[5]3	1	..	..	4
	Dilatation (1)	...	..	..	..	...
	Plastic on urethra (1)	...	..	..	..	...
	Acute urethritis, acute prostatis	[3]1	..	..	..	1

1 Three cases medical treatment.
2 Left against advice.
3 Medical treatment.
4 Two cases not operated on.
5 One case medical treatment.
6 Pneumonia.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
URINARY SYSTEM.—Concluded.						
Acute urethritis, hydrocele	Local treatment (1)	...	1	..	..	1
Acute urethritis, stricture	.....	...	[1]1	..	..	1
Acute urethritis, urethral fistula	Local treatment (1)	...	1	..	..	1
Peri-urethral abscess	Incision and drain (2)	1	1	..	..	2
Incontinence of urine	Circumcision (1)	1	..	..	..	1
Retention of urine	Catheterization (1)	...	2	..	..	2
	Bladder irrigation (1)	...	..	..	..	
Retention of urine, acute congestive prostatitis	Bladder irrigation (1)	1	[1]1	..	..	2
Total Urinary System: Cases .....81 Died....2 Operations .....55 Died....2	Total	38	34	7	2	81
MALE GENITALS.						
Penis.						
Phimosis	Circumcision (6)	6	..	..	..	6
Phimosis, adenoids	Circumcision, curettage of adenoids (2)	2	..	..	..	2
Phimosis, adenoids and tonsils	Circumcision, curettage of adenoids, tonsilectomy (2)	2	..	..	..	2
Paraphimosis	Circumcision (1)	1	..	..	..	1
Redundant foreskin	Circumcision (6)	6	..	..	..	6
Adherent foreskin	Retraction of foreskin (1)	1	..	..	..	1
Tunica Vaginalis.						
Hydrocele	Dissection of tunica vaginalis (3)	5	..	..	..	5
	Tapping and injection of carbolic acid (1)	...	..	..	..	
	Bottle operation (1)	...	..	..	..	

1 Medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
MALE GENITALS.—Continued.						
Testicle.						
Undescended testicle	Freeing testicle and cord, fixation in scrotum (3).	4	..	..	..	4
	Castration (1)	...	..	..	..	
Double undescended testicle	Lengthening cords, placing testicles in scrotum (1)	1	..	..	..	1
Chronic inflammation of testicle	Castration (1)	1	..	..	..	1
Tubercular orchitis	Castration (3)	2	2	..	..	4
	Orchidectomy (1)	...	..	..	..	...
	Epididymitis	[1]2	[1]1	..	..	3
Scrotum and Cord.						
Hydrocele of the cord	Excision (1)	1	..	..	..	1
Prostate.						
Hypertrophied prostate	Prostatectomy (11, 3 died)	8	..	[2]1	[3]4	13
Hypertrophied prostate, vesical calculus, cystitis	Lithopexy, irrigations (1 died)	...	..	..	1	1
Prostatic abscess	Incision and drain (1)	1	..	1	..	2
Adenoma of the prostate, adeno-carcinoma of the perineum	Cystoscopy (1)	...	..	[2]1	..	1
Carcinoma of the prostate, rectovesical fistula	.....	...	..	[2]1	..	1
Sarcoma of the prostate	Supra-pubic cystotomy (1 died)	...	..	..	1	1
General.						
Varicocele	Excision of veins (21)	22	[2]2	[2]2	..	26
	Ligation of veins (1)	...	..	..	..	
Double varicocele	Double excision of veins (2)	2	..	..	..	2
Varicocele, redundant foreskin	Excision of veins, circumcision (2)	2	..	..	..	2

1 Medical treatment.
2 Not operated on.
3 One case not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
MALE GENITALS.—Concluded.						
Venereal warts	Local treatment (1)	...	..	..	..	
	Radium application (1)	...	2	..	..	2
Total Male Genitals: Cases .....88 Died....6 Operations .....57 Died....5	Total	69	7	6	6	88
FEMALE GENITALS.						
Vulva.						
Adherent clitoris	.....	...	..	[1]1	..	1
Vulvo-vaginal cyst	Excision (1)	1	..	..	..	1
Vulvo-vaginal abscess	Incision and drain	1	..	..	..	1
Epithelioma of vulvo-vaginal gland	Excision of the growth and the femoral glands (1)	1	..	..	..	1
Carcinoma of vulva	Excision with plastic on vulva (1)	1	..	..	..	1
Perineum.						
Laceration of the perineum	Perineorrhaphy (25)	24	1	[1]2	..	27
Laceration of the perineum, endometritis	Perineorrhaphy, curettage (8)	8	..	[2]1	..	9
Laceration of the perineum, fissure in ano, hemorrhoids	Perineorrhaphy, dilatation of the sphincter, clamp and cautery (1)	1	..	..	..	1
Laceration of the perineum, vesico-vaginal fistula	Perineorrhaphy, Sim's inversion operation (1)	1	..	..	..	1
Laceration of the perineum, cystocele	Perineorrhaphy, anterior colporrhaphy (1)	1	..	..	..	1
Laceration of the perineum, and cervix	Perineorrhaphy, trachelorrhaphy (7)	7	..	..	..	7

1 Left against advice.
2 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
FEMALE GENITALS.—Continued.						
Laceration of the perineum and cervix, cystocele	Perineorrhaphy, amputation of the cervix, anterior colporraphy (1).	1	..	..	..	1
Laceration of the perineum and cervix, hemorrhoids	Perineorrhaphy, trachelorrhaphy, clamp and cautery (1)	1	..	[1]1	..	2
		...	..	..	..	...
Vagina.						
Atresia of vagina	Incision and packing (1)	1	..	..	..	1
Atresia of vagina, hemorrhoids		...	..	[1]1	..	1
Fecal fistula into vagina, post operative	Local treatment (1)	1	..	..	..	1
Gonorrheal vaginitis	Douches (1)	...	1	..	..	1
Carcinoma of vagina		...	..	[2]1	..	1
Uterus.						
(a) *Cervix.*						
Laceration of the cervix	Trachelorrhaphy (5).	5	..	[1]1	..	6
Laceration of the cervix, endometritis.	Trachelorrhaphy, curettage (4)	4	..	..	..	4
Laceration of the cervix, cystic ovary, endometritis, chronic appendicitis	Trachelorrhaphy, oophorectomy, curettage, appendectomy (1).	1	..	..	..	1
Laceration of the cervix with hypertrophy, retroversion	Amputation of the cervix with ventral suspension (1)	1	..	..	..	1
Erosions of the cervix		...	..	[1]1	..	1
Hypertrophied cervix, vaginitis		...	[2]1	..	..	1
Hypertrophied cervix, caruncle of the urethra	Trachelorrhaphy, plastic on urethra (1).	1	..	..	..	1
Cervical polyp	Excision, curettage (2)	2	..	..	..	2
Epithelioma of the cervix		...	[3]1	..	..	1
Carcinoma of the cervix	Pan hysterectomy (6)	5	2	[4]2	..	9
	Cautery (1)	...	..	..	..	
	Cautery and curettage (1)	...	..	..	..	

1 Left against advice.
2 Not operated on.
3 Medical treatment.
4 One case not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
FEMALE GENITALS.—Continued.						
Carcinoma of the cervix, fibromata of the uterus	.....	...	[1]1	..	..	1
(b) *General.*						
Prolapse	Ventral fixation, perineorrhaphy (8)	12	..	[2]1	..	13
	Vaginal hysterectomy (1)	...	..	..	..	
	Perineorrhaphy, trachelorrhaphy (3)	...	..	..	..	
Prolapse, cystocele, rectocele	Anterior colporrhaphy, ventral fixation, perineorrhaphy (2)..	3	..	..	..	3
	Anterior colporrhaphy, perineorrhaphy (1).	...	..	..	..	
Anteflexion, opium habit	.....	...	..	[2]1	..	1
Retroflexion	Ventral fixation (1)..	2	..	..	..	2
	Ventral suspension (1)	...	..	..	..	...
Retroversion	Ventral fixation (5)..	18	..	..	..	18
	Ventral suspension (9)	...	..	..	..	
	Alexander operation (3)	...	..	..	..	
	Laparotomy and separation of adhesions (1)	...	..	..	..	
Retroversion, lacerated perineum	Perineorrhaphy, ventral suspension (5).	5	..	..	..	5
Retroversion, chronic appendicitis	Ventral suspension, curettage, appendectomy (3).	3	..	..	..	3
Retroversion, chronic salpingitis, chronic appendicitis	Shortening utero-sacral ligaments, double partial salpingectomy, Gilliam operation for appendix.	1	..	..	..	1
Retroversion, cystic ovary	Ventral suspension, oophorectomy (3)..	3	..	..	..	3
Retroversion, double cystic oophoritis.	Ventral suspension, plastic on ovaries (2).	2	..	..	..	2

1 Medical treatment.
2 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
FEMALE GENITALS.—Continued.						
Retroversion, left femoral hernia	Ventral suspension, herniotomy (1)	1	..	..	..	1
Endometritis	Curettage (53)	50	[1]6	[2]3	..	59
Retained secundines	Curettage (15)	15	..	..	..	15
Endometritis and anteflexion	Curettage (1)	1	..	..	..	1
Endometritis, pelvic abscess	Curettage, posterior colpotomy (1)	1	..	..	..	1
Endometritis and retroversion	Curettage, ventral suspension (6)	18	..	..	..	18
	Curettage, ventral fixation (5)	...	..	..	..	
	Curettage, Alexander operation (4)	...	..	..	..	
	Curettage, Gilliam operation (1)	...	..	..	..	
	Curettage (2)	...	..	..	..	
Endometritis with inflammation of appendix or tubes	Curettage, oophorectomy (3)	7	[3]1	..	..	8
	Curettage, salpingectomy (1)	...	..	..	..	
	Curettage, plastic on ovaries, appendectomy (1)	...	..	..	..	
	Curettage, double salpingo-oophorectomy (1)	...	..	..	..	
	Curettage (1)	...	..	..	..	
Endometritis, hemorrhoids	Curettage, clamp and cautery (1)	1	..	..	..	1
Endometritis, hypertrophied cervix	Curettage, partial amputation of cervix (1).	1	..	..	..	1
Endometritis, cyst adenoma of breast	Curettage, amputation of breast (1)	1	..	..	..	1
Endometritis, retroversion, double salpingitis	Curettage, ventral fixation, partial salpingectomy, salpingo-oophorectomy (1).	1	..	..	..	1
Endometritis, retroversion, lacerated perineum	Curettage, perineorrhaphy, anterior fixation (1)	1	..	..	..	1
Endometritis, retroversion, lacerated cervix and perineum	Curettage, Alexander operation, trachelorraphy, perineorrhaphy (1).	1	..	..	..	1

1 Three cases not operated on.
2 Not operated on.
3 Medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
FEMALE GENITALS.—Continued.						
Perimetritis		[1]1	..	..	..	1
Fibromyoma of uterus	Supravaginal hysterectomy (31, 1 died)	44	[2]6	[3]2	3	55
	Myomectomy (14, 1 died)	...	..	..	..	
	Vaginal myomectomy (2, 1 died)	...	..	..	..	
	Curettage (2)	...	..	..	..	
Fibromyoma with inflammation of appendix or tubes	Supravaginal hysterectomy, appendectomy (1)	3	[3]1	[3]1	..	5
	Myomectomy, excision of cyst (1)	...	..	..	..	
	Myomectomy, appendectomy, plastic on ovary (1)	...	..	..	..	
Fibromyoma, ventral hernia	Hysterectomy, herniotomy (1)	1	..	..	..	1
Fibromyoma, retroversion	Myomectomy, ventral fixation (1)	1	..	..	..	1
Fibromyoma, retroversion, cystic ovary, double salpingitis	Myomectomy, ventral fixation, double salpingectomy, oophorectomy (2).	2	..	..	..	2
Fibromyoma, abortion	Douches (1)	...	1	..	..	1
Fibromyoma, pregnancy, pneumonia		...	[4]1	..	..	1
Fibromyoma, salpingitis, hemorrhage from the bowel	Myomectomy, salpingectomy, transfusion (1).	1	..	..	..	1
Fibromyoma, prolapse, cystocele, rectocele	Supravaginal hysterectomy, perineorrhaphy (1).	1	..	..	..	1
Calcified fibromyoma, double salpingo-oophoritis	Excision of fibroid, double salpingo-oophorectomy (1).	1	..	..	..	1
Uterine polyp	Vaginal excision (1).	1	..	..	..	1
Carcinoma of the uterus	Hysterectomy (1 died)	...	2	..	1	3
	Cauterization of cervix (1)	...	..	..	..	
	Curettage of cervix (1)	...	..	..	..	

1 Medical treatment.
2 Four cases not operated on.
3 Not operated on.
4 Transferred to Medical Division.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
FEMALE GENITALS.—Continued.						
Carcinoma of the uterus, bladder and rectum	Panhysterectomy (1 died)	..	..	..	1	1
Fallopian Tubes.						
Salpingitis	Salpingectomy (5)	[1]7	[2]2	[3]3	..	12
Double salpingitis	Double salpingectomy (3)	3	[3]1	..	..	4
Salpingitis with retroversion	Salpingo-oophorectomy, ventral suspension (2).	3	..	..	..	3
	Salpingectomy, ventral suspension (1)	..	..	..	..	.
Salpingo-oophoritis	Salpingo-oophorectomy (32, 1 died)	31	..	[3]3	1	35
Salpingo-oophoritis, appendicitis	Salpingo-oophorectomy, appendectomy (6)	6	..	..	..	6
Double salpingo-oophoritis with abscess	Double salpingo-oophorectomy (8)	10	1	..	..	11
	Incision and drain (1)	..	..	..	..	
	Partial excision, posterior colpotomy (2)	..	..	..	..	
Double salpingo-oophoritis, hypertrophied cervix	Double salpingo-oophorectomy, amputation of cervix (1)	1	..	..	..	1
Double salpingo-oophoritis, endometritis	Double salpingo-oophorectomy, curettage (1)	1	..	..	..	1
Double pyosalpinx, uræmia	Double salpingo-oophorectomy, hysterectomy (1 died)	..	..	..	1	1
Double hematosalpinx, cystic ovary	Double salpingectomy, oophorectomy (1)	1	..	..	..	1
Double hydrosalpinx, retroversion, lacerated cervix and perineum	Partial double salpingectomy, perineorrhaphy, trachelorrhaphy (1)	1	..	..	..	1
Right salpingitis, left tubeovarian cyst	Right salpingectomy, left salpingo-oophorectomy (1)	1	..	..	..	1

1 Two cases medical treatment.
2 Medical treatment.
3 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
FEMALE GENITALS.—Continued.						
Hematosalpinx, pelvic cyst	Salpingectomy, excision of cyst (1)	1	..	..	..	1
Hydrosalpinx	.....	...	[1]1	..	..	1
Acute salpingitis with spreading peritonitis	Double salpingectomy, irrigation (1)	...	1	..	..	1
Tubercular salpingo-oophoritis, stenosis of cervix, retroversion	Salpingectomy, salpingo-oophorectomy, curettage, ventral suspension (1)	1	..	..	..	1
Ovary.						
Prolapse of ovary, stenosis of cervix, ilius	Suspension of ovary, dilatation of cervix (1 died).	...	..	..	1	1
Prolapsed and inflamed ovary	.....	...	[2]2	..	..	2
Prolapsed cystic ovary, endometritis	Vaginal section, curettage (1)	1	..	..	..	1
Cyst of ovary	Oophorectomy (9)	16	..	[3]1	..	17
	Plastic operation (5)	...	..	..	..	
	Salpingo-oophorectomy (2)	...	..	..	..	
Cysts of both ovaries	Double salpingo-oophorectomy (4)	4	..	..	..	4
Cystic ovaries, chronic appendicitis	Plastic on both ovaries, appendectomy, curettage (1)	1	..	..	..	1
Cystic ovaries, chronic appendicitis, lacerated perineum	Plastic on both ovaries, appendectomy, perineorrhaphy (1)	1	..	..	..	1
Double ovarian cyst, fibroma	Excision, myomectomy (1)	1	..	..	..	1
Dermoid cyst of ovary, lacerated perineum	Oophorectomy, perineorrhaphy (1)	1	..	..	..	1
Cyst adeno-carcinoma of ovaries, fibromyomata	Panhysterectomy (1)	...	1	..	..	1
Cyst adeno-carcinoma of ovaries	Supravaginal hysterectomy (1)	...	1	..	..	1
Adeno-carcinoma of ovary	Salpingo-oophorectomy (1)	1	..	..	..	1
Ovarian abscess with intestinal obstruction	Excision of ovary with drain (1 died)	...	..	..	1	1

1 Not operated on.
2 Medical treatment.
3 Left against advice.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
FEMALE GENITALS.—Continued.						
Carcinoma of ovary	Excision (1)	1	..	1	..	2
	Exploratory laparotomy (1)	...	..	..	..	
Carcinoma of both ovaries with peritonitis	Double oophorectomy (1 died)	...	..	..	1	1
Carcinoma of ovary with carcinoma of peritoneum	Laparotomy with removal of fluid (1)	...	1	..	..	1
Ligaments. (Broad and Round.)						
Cellulitis of broad ligament	Laparotomy and drain (1)	1	..	..	..	1
Intraligamentous cyst	Posterior colpotomy, partial excision and drain (2)	4	..	..	..	4
	Right oophorectomy (1)	...	..	..	..	
	Excision (1)	...	..	..	..	
Intraligamentous cyst, salpingo-oophoritis, endometritis, retroversion	Excision, salpingo-oophorectomy, curettage, anterior suspension (1)	1	..	..	..	1
Tumor in broad ligament	Excision (1)	1	..	..	..	1
Pregnancy and Labor.						
Pregnancy		...	..	7	..	7
Pregnancy, tuberculosis	Curettage (1)	1	..	..	..	1
Pregnancy, nephritis	Curettage (1)	1	..	..	..	1
Toxæmia of pregnancy		...	[1]1	..	..	1
Eclampsia	Delivery of fœtus (1 died)	...	..	..	1	1
Abortion, toxic nephritis		...	..	..	[2]1	1
Double vagina and uterus, pregnancy		...	..	1	..	1
Threatened abortion, iritis		...	..	[3]2	..	2
Incomplete abortion	Curettage (23)	[4]25	..	[5]1	..	26
	Douches (1)	...	..	..	..	
Incomplete abortion, pelvic abscess	Curettage and posterior colpotomy (1)	1	..	..	..	1
Ectopic gestation	Partial salpingo-oophorectomy (8)	8	..	..	..	8
General.						
Menorrhagia	Curretage (1)	1	[2]1	..	..	2
Metrorrhagia	Curettage (2)	2	..	..	..	2

1 Medical treatment.
2 Not operated on.
3 Transferred to Medical Division.
4 One case medical treatment.
5 Left against advice.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
FEMALE GENITALS.—Concluded.						
Cystocele	Anterior colporrhaphy (1)	1	..	..	..	1
Cystocele and rectocele	Anterior fixation of cervical stump (1).	1	..	..	..	1
Pelvic inflammation	Local treatment (2)..	[1]5	[2]1	[2]1	..	7
Pelvic abscess	Posterior colpotomy and drain (13, 1 died).	10	2	..	1	13
Pelvic abscess, abscess of the lung, septicæmia	Posterior colpotomy (1 died)	...	..	..	1	1
Peritonitis	Ice bag	1	..	..	..	1
Puerperal sepsis	.....	...	..	..	[2]1	1
Hydatidiform mole, infected fibroid...	Abdominal section with drain, curettage (1)	1	..	..	..	1
Total Female Genitals: Cases .....527 Died....15 Operations .....451 Died....13	Total.....	432	41	39	15	527
BONES AND PERIOSTEUM.						
Fragilitas ossium	Braces (1).....	...	1	..	..	1
Fragilitas ossium, fracture of thigh...	Brace (1).....	1	..	..	..	1
FRACTURES.						
Colles fracture, scalp wound	Setting under ether (1)	...	1	..	..	1
Old Colles fracture	Fracture reset (1)....	1	..	..	..	1
Compound fracture of both bones of forearm and wrist	Incision, suture of fragments, cast (1)	...	1	..	..	1
Compound fracture of right forearm, infection	Incision and drain (1)	...	1	..	..	1
Fracture of both bones of forearm	Plaster (2)	1	2	..	..	3
	Open operation with wiring (1)	...	..	..	..	
Fracture both bones right forearm, left Colles	Casts (1)	1	..	..	..	1
Ununited fracture of radius and ulna..	Incision and wiring (1)	1	..	..	..	1

1 Three cases medical treatment.
2 Medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
BONES AND PERIOSTEUM.—Continued.						
Compound fracture of elbow	Incision and setting of fragments (2)	...	2	..	..	2
Fracture and dislocation of elbow	Incision and reduction (1)	2	..	..	..	2
	Reduction with splints (1)	...	..	..	..	
Fracture of second metacarpal bone with infection	Incision and drain (1)	...	1	..	..	1
Fracture of left humerus, left Colles	Reduction and immobilization (1)	...	1	..	..	1
Fracture of humerus	Splints and traction (3)	1	2	..	..	3
Old fracture of head of humerus	Excision of head (1)	1	..	..	..	1
Fracture of humerus and olecranon	Plaster band (1)	...	1	..	..	1
Fracture of clavicle	Splints and bandage (2)	...	3	..	..	3
	Osteotomy (1)	...	..	..	..	
Fracture and dislocation of right shoulder	Wiring bones (1)	...	1	..	..	1
Fracture of femur	Buck's extension (5)	5	[1]5	[2]2	[3]1	13
Fracture of femur with shortening	Osteotomy (1)	...	1	..	..	1
Old fracture of femur	Wiring of fragments with brace (1)	...	1	..	..	1
Compound fracture of femur	Incision and setting bones (1)	1	..	..	..	1
Fracture of neck of femur, suppurating wound, bed sores	Fixation with bone pins (1 died)	...	..	..	1	1
Impacted fracture of neck of femur	.....	...	[1]1	..	..	1
Fracture of necks of both femora	Bone pegs (1)	1	..	..	..	1
Fracture of patella	Open operation (1)	1	[1]1	..	..	2
Fracture of leg	Amputation below the hip (1 died)	...	..	..	1	1
Ununited fracture of leg	Incision and wiring (1)	1	..	1	..	2
	Open operation, casts, radium treatment (1)	...	..	..	..	
Fracture of both bones of left leg and of left forearm	Splints (1)	...	1	..	..	1
Fracture of tibia and fibula	Splints (1)	3	..	..	..	3
	Wiring bones (1)	...	..	..	..	
	Casts and incision and reduction of fibula (1)	...	..	..	..	

1 Medical treatment.
2 Left against advice.
3 Pneumonia.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
BONES AND PERIOSTEUM.—Concluded.						
Fracture of tibia	Casts (2)	2	..	..	..	2
Pott's fracture	Casts (3)	2	1	..	..	3
Fracture of fibula	Plaster (1)	...	1	..	..	1
Fracture of internal malleolus	Casts (1)	1	..	..	..	1
Sub-periosteal abscess of tibia, pyæmia	Incision and drain (1 died)	...	..	..	1	1
Osteomyelitis of femur	Incision, curettage and drain (5)	1	4	[1]1	..	6
Osteomyelitis of left arm and leg	Removal of sequestrum (1)	1	..	..	..	1
Osteomyelitis of fibula	Excision of fibula (1)	1	1	..	..	2
	Curettage and drain (1)	...	..	..	..	
Osteomyelitis of tarsus and metatarsus	Incision, curettage and drain (1)	1	..	..	..	1
Tubercular osteomyelitis of tibia	Incision, curettage and drain (1)	...	1	..	..	1
Multiple tubercular osteomyelitis	Curettage of bones (1 died)	...	..	..	1	1
Tubercular osteitis of ribs	Resection of ribs (1)	...	..	..	..	
	Incision and drain (1)	...	2	..	..	2
Tuberculosis of ankle	Incision, curettage and drain (1)	...	1	..	..	1
Tuberculosis of first metatarsal and scaphoid bones	Arthrectomy (1)	1	..	..	..	1
Tubercular sinus of thigh	Incision and drain (1)	...	1	..	..	1
Tubercular sinus of sacrum	Bismuth injection (1)	...	1	..	..	1
Sarcoma of ilium	.....	...	..	..	[2]1	1
Osteoma of head of femur	Ankylosis of joint (1)	1	..	..	..	1
Total Bones and Periosteum:						
Cases .....82 Died....6	Total.....	32	40	4	6	82
Operations .....68 Died....4			7			

1 Not operated on.
2 Medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
JOINTS AND LIGAMENTS.						
Genu varum	.....	...	..	[1]2	..	2
Double hallux valgus	Excision of bursæ, osteotomy (1)	1	..	..	..	1
Ankylosis of jaw	Excision of condyles part of rami. (1)	1	..	..	..	1
Ankylosis of elbow	Manipulation under ether (1)	...	1	..	..	1
Ankylosis of finger	.....	1	..	..	..	1
Ankylosis of knee	Plaster bandages (1)	...	1	..	..	1
Ankylosis of knee, chronic arthritis	.....	...	..	[1]1	..	1
Rupture of internal lateral ligament of knee	.....	...	[2]1	..	..	1
Floating cartilage in knee joint	Incision and removal (3)	3	..	..	..	3
Loose body in knee joint, varicocele, hemorrhoids	Arthrotomy, excision of veins, clamp and cautery (1)	1	..	..	..	1
Dislocated shoulder	Reduction under ether (3)	3	..	..	..	3
Dislocated clavicle	Immobilization (1)	...	1	..	..	1
Dislocated elbow (posterior)	Reduction and splints (2)	2	..	..	..	2
Dislocated thumb	Reduction under ether (1)	1	..	..	..	1
Subluxation of ankle, fractured rib	Cast, strapping (1)	1	..	..	..	1
Arthritis of shoulder	Local treatment (1)	...	1	..	..	1
Chronic arthritis of elbow joint with disintegration	.....	...	[2]1	..	..	1
Chronic synovitis of knee	Incision and drain (2)	1	1	..	..	2
Traumatic synovitis of knee	Bandages with splint (3)	3	..	..	..	3
Septic arthritis of knee	Incision and drain (1)	...	1	..	..	1
Septic arthritis of knee, septicæmia	Incision and drain (1 died)	...	..	..	1	1
Gonorrheal arthritis	.....	[3]1	[2]2	..	..	3
Tubercular arthritis of elbow	Arthrectomy (2)	1	1	[1]1	..	3
Tubercular arthritis of knee	Resection (1)	1	..	..	..	1

1 Not operated on.
2 Medical treatment.
3 Serum treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
JOINTS AND LIGAMENTS.—Concluded.						
Cystic bursa, Charcot's joint	Arthrotomy (1)	...	1	..	..	1
Prepatellar bursitis	Incision and drain					
Total Joints and Ligaments: Cases .....39 Died....1 Operations .....24 Died....1	(1)	1	..	..	..	1
	Total	22	12	4	1	39
PERIPHERAL NERVES.						
(a) *Cranial.*						
Bulbar paralysis		...	..	[1]1	..	1
Supraorbitral neuralgia		...	..	[1]1	..	1
Neuralgia of inferior dental nerve	Neurectomy (1)	1	..	..	..	1
Tic doloreux	Alcohol injection (4).	3	4	..	..	7
	Intracranial neurectomy (2)	...	..	..	..	
	Resection of supraorbital nerve with osmic acid injection (1)	...	..	..	..	
Severed spinal accessory nerve	Plastic on nerve (1).	...	1	..	..	1
(b) *Spinal.*						
Neurofibromata of sciatic nerve	Excision (1)	1	..	..	..	1
Rupture of internal popliteal nerve, lacerated wound of leg	Suture of nerve (1)	...	1	..	..	1
Total Peripheral Nerves: Cases .....13 Died....0 Operations .....11 Died....0	Total	5	6	2	0	13
VASCULAR SYSTEM.						
(a) *Arteries.*						
Hemorrhage and pressure on spinal cord		...	[1]1	..	..	1
Cerebral endarteritis		...	..	[2]1	..	1

1 Medical treatment.
2 Not operated on.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
VASCULAR SYSTEM.—Concluded.						
(b) *Veins.*						
Varicose veins of leg	Excision (18)	18	..	..	..	18
Varicose ulcer of leg	Local treatment (4)	3	2	..	..	5
	Excision with skin graft (1)	...	..	..	..	
Ulcer of leg, senility, myocarditis	.....	...	[1]1	..	..	1
Total Vascular System:						
Cases .....26 Died....0	Total	21	4	1	0	26
Operations .....19 Died....0						
AMPUTATIONS AND DISARTICULATIONS.						
Diabetic gangrene of foot	Amputation through thigh (1)	2	..	..	1	3
	Amputation through knee (1 died)	...	..	..	..	
	Amputation through leg (1)	...	..	..	..	
Diabetic gangrene of leg	Amputation through upper third of thigh (1 died)	...	..	..	1	1
Diabetic gangrene of great toe	Amputation through middle third of thigh (1)	...	1	..	..	1
Gangrene of foot, elephantiasis	Amputation through thigh (1)	1	..	..	..	1
Tubercular arthritis of tarsus and ankle	Amputation through leg (1)	1	..	..	..	1
Gangrene of toes, arteriosclerosis	Amputation below the knee (1)	1	..	..	..	1
Gangrene of toe	Amputation of toe (3, 1 died)	1	..	1	1	3
Perforating ulcer of toe	Amputation of toe (2)	1	[2]1	..	..	2
Hammar toe	Amputation of toe (2)	2	..	..	..	2
Total Amputations:						
Cases .....15 Died....3						
Operations .....15 Died....3	Total	9	2	1	3	15

1 Medical treatment.
2 Transferred to Bellevue Hospital.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
MISCELLANEOUS.						
Burns of arms, legs and body	Dressings (2)	2	..	..	..	2
Burns of arm and face	Wet dressings (1 died)	...	..	..	1	1
Burns of leg	Dressings (1)	2	..	..	..	2
	Open treatment (1)	...	..	..	..	
Bed sores, general paresis, diabetes, locomotor ataxia		...	..	[1]1	..	1
Incised wounds of arms, legs and neck, acute nephritis	Suture of wounds (1 died)	...	..	..	1	1
Multiple abscesses, pyæmia	Incision and drain (1)	1	..	..	..	1
Multiple abscesses of back and shoulder, metritis, double empyema	Incision and drain (1)	1	..	..	..	1
Insect bites		1	..	..	..	1
Shock and contusions		[1]1	..	..	..	1
Epistaxis		[1]1	..	..	..	1
Unhealed amputation stump	Skin grafting (1)	1	..	..	..	1
For transfusion	Transfusion (1)	1	..	..	..	1
Hematoma in appendix wound	Drain (1)	1	..	..	..	1
Lympho-sarcoma		...	..	[1]1	..	1
Psoas abscess	Incision and drain (1)	1	..	..	..	1
Persistent lumbar sinus	Exploration and curettement (1)	1	..	..	..	1
No diagnosis		...	..	1	..	1
No surgical condition		...	..	12	..	12
Mental deficiency		...	..	[1]1	..	1
Malnutrition, enlarged lymph glands		...	..	[1]1	..	1
Total Miscellaneous: Cases .....33 Died....2 Operations ..... 8 Died....2	Total	14	0	17	2	33
MEDICAL CONDITIONS.						
Diabetes with epistaxis		...	..	[2]1	..	1
Diabetes with hemorrhage		...	[2]1	..	..	1
Syphilis, inguinal hernia		...	..	[2]1	..	1
Syphilitic ulcers on knee		...	[2]1	..	..	1
Typhoid fever with perforation		...	[2]1	..	..	1
Typhoid fever, varicocele		...	..	[2]1	..	1

1 Not operated on.
2 Medical treatment.

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
MEDICAL CONDITIONS.—Concluded.						
Typhoid fever, pregnancy	.....	...	..	[1]1	..	1
Typhoid fever	Exploratory laparotomy (1)	...	[1]1	..	..	1
Arteriosclerosis, enlarged prostate	.....	...	[1]1	..	..	1
Malaria	.....	...	[1]1	[1]2	..	3
Hodgkin's disease	Removal of left axillary nodes (1)	...	1	..	..	1
Hemophilia, hematuria	.....	...	[2]1	..	..	1
Hematuria	.....	...	[2]1	..	..	1
Lumbar myalgia	.....	...	..	[3]1	..	1
Rheumatic synovitis	.....	...	[2]1	..	..	1
Acute alcoholism	.....	[2]1	..	..	..	1
Neurasthenia	.....	...	[2]7	[2]9	..	16
Acute melancholia	.....	...	..	[2]1	..	1
Multiple sclerosis	.....	...	[2]1	..	..	1
Tabes dorsalis, Charcot's joint	.....	...	..	[3]1	..	1
Tabes dorsalis, anæmia	.....	...	..	[1]1	..	1
General paresis	.....	...	..	[3]1	..	1
Hysterical aphonia	.....	[2]1	..	..	..	1
Hysterical epilepsy	.....	...	..	[2]1	..	1
Endocarditis, pericarditis, general sepsis	.....	...	..	..	[2]1	1
Tubercular meningitis	.....	...	..	[2]1	..	1
Pneumonia, pleurisy with effusion	.....	...	..	[2]1	..	1
Dry pleurisy, floating kidney, neurasthenia	.....	...	[2]1	..	..	1
Tubercular pleurisy	.....	...	[2]1	[2]1	..	2
Traumatic pleurisy, dislocation of costo-chondral joint	.....	[2]1	..	..	..	1
Acute nephritis	.....	[2]1	..	..	..	1
Acute nephritis, acute pericarditis	.....	...	..	..	[2]1	1
Enteroptosis	Strapping (1)	...	1	..	..	1
Gout and constipation	.....	[2]1	..	..	..	1
Chronic gastritis	.....	...	[2]1	[2]1	..	2
Intestinal grippe	.....	[2]1	..	..	..	1
Constipation	Protoscopy (1 cured)	[4]2	[4]2	..	..	4
Total Medical Conditions: Cases .....59 Died....2 Operations ..... 3 Died....0	Total.....	8	24	25	2	59

1 Transferred to Medical Division.
2 Medical treatment.
3 Not operated on.
4 Three cases medical treatment.

TOTAL.

	CASES	DIED	OPERATIONS	DIED
Head	282	14	220	12
Neck	102	7	80	5
Thorax	97	1	82	0
Back	17	1	10	1
Abdomen	508	45	460	39
Pelvis	127	7	110	7
Extremities	106	3	72	3
Urinary System	81	2	55	2
Male Genitals	88	6	57	5
Female Genitals	527	15	451	13
Bones and Periosteum	82	6	68	4
Joints and Ligaments	39	1	24	1
Peripheral Nerves	13	0	11	0
Vascular System	26	0	19	0
Amputations and Disarticulations	15	3	15	3
Miscellaneous	33	2	8	2
Medical Conditions	59	2	3	0
Totals	2,202	115	1,745	97

THE PRESENT STATUS OF RADIUM THERAPEUTICS.

ROBERT ABBE, M.D.

Owing to a desire to prove or disprove the early claims of popular writers on the efficiency of Radium in disease—the author obtained some of the first and strongest Radium made by Madame Curie and sent out of France, in February, 1903. Since that time he has added a larger quantity of the most powerful made both by the German and French chemists and have been able to definitely test its efficiency on disease both in St. Luke's Hospital and, to a larger extent, in private work.

It is now possible to say that results can be obtained by Radium not heretofore produced by other surgical agents.

Both laboratory and clinical experience are constantly accumulating to show that we have by no means reached the limit of understanding its power and that unquestionably the future will add to our knowledge of its value and interest.

The published results credited to it are necessarily slow to accumulate—for two reasons:—1st, There is so small an amount of Radium obtainable for use that the writers and experimenters are very limited in number; 2nd, The few observers who have adequate material for testing it are cautious in not prematurely making claims.

It is necessary for a general hospital surgeon to give to every patient the best accredited surgery—and not experiment with new agents, except in hopeless cases or where the patient thoroughly understands the work offered. Hence, one has few cases to select from which experience does not demand shall be treated on regulation lines. There are a few, however, from time to time presenting themselves which are the despair of the surgeon, and a few such have been treated by Radium. Besides these a number of minor cases indicated in the various titles mentioned have given a wide scope to the study of its influence.

At the Friday Surgical Clinic of St. Luke's Hospital there have been shown from time to time during five years past not only cases

treated, but demonstration of peculiar influence of Radium on normal skin and on seeds planted and grown after being subjected to its rays for two to twelve hours, showing its varying arresting influence. In the laboratory also bacterial culture plates have demonstrated its fatal influence on bacteria, which refuse to grow in its presence, but flourish wherever a small protecting device of lead shields them.

The best demonstration of its unique influence is seen in cases of epithelial cancer of the face. Most of these, from one-half to one inch in diameter, can be cured at one sitting by strong Radium hermetically sealed in a small glass tube and applied for one hour. One illustrative example will suffice. A man, having at the outer corner of his eye a cancer involving both lids and the skin at the angle fully an inch in diameter, was treated with one Radium tube applied during the clinic for an hour and a quarter. He remained in the hospital eight weeks. The growth melted away day by day, until at his discharge not a vestige could be seen.

He remains perfectly well a year and a half afterwards.

One case of small celled sarcoma of the lower eyelid, three quarters of an inch in length and a half inch in diameter, resisting all other treatment, including Rontgen rays, was permanently cured by four sittings of one hour each and remains well after four years, defying keen observation to say on which eyelid the tumor existed.

An elderly lady with epithelial cancer of the lip, nose and cheek, growing for seven years, which Dr. Wood (Pathologist at St. Luke's), pronounced basal celled epithelioma, was cured by seven applications, and has remained well five years after. The cure was complete at the end of five weeks.

I have treated about a hundred and fifty cases of facial epithelioma, and with uniform healing effect.

Some about the eyelids are very easy to cure, and others resist.

Where the periosteum and underlying bones are invaded the results are often doubtful of permanency and it seems wiser to carry out complete surgical excision.

No more striking and valuable addition to its marvellous action can be shown, than has been demonstrated by cases in St. Luke's Hospital of so-called giant celled sarcoma, a destructive form of malignant tumor affecting bones. The growth of these is from the central bone

marrow, the peculiar giant cell found there undergoes rapid increase and constitutes the bulk of the tumor.

As this enlarges it absorbs the bone and (as in the jaw, or hard palate,) there is soon developed a hopelessly bad condition which, if removed, leaves a loss of bone which cannot be replaced.

Note now how the Radium acts—

It radiates its specific effect through the mass of soft tumor and in two weeks (often less) there is a firm change taking place, resembling inflammatory irritation.

The overgrown mass of riotous cell growth begins now to retrograde and, if a bit is subjected to pathological study, it is seen the cells have lost their life and will not stain with the chemical reagents usually used to show their character. Then slowly the bone begins to form in points all through the soft mass which, from being merely gritty, soon ossifies more solidly, and at last becomes again a solid bone, smaller than the recent soft tumor but larger than the original bone.

This retrograde change however does not stop here. Teeth which were loosely embedded and falling out of the pulpy mass, are once more solidly and permanently fixed.

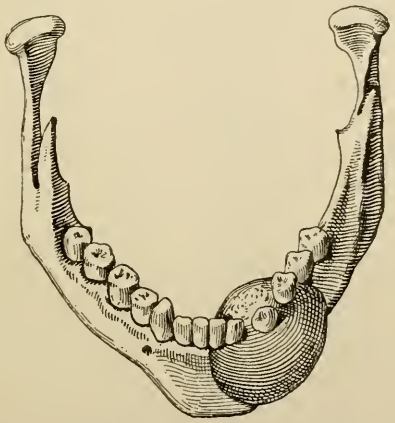


FIG. 4.—EXACT REPRESENTATION OF A GIANT-CELL SARCOMA OF THE JAW OF RAPID GROWTH DURING TWO MONTHS: PRIOR TO TREATMENT BY RADIUM RAYS.

In one case of such a tumor of the lower jaw, which had practically destroyed the whole bone for an inch and a half along one side, it was not only soon entirely solid though retaining something of the

shape of the tumor, but, wonderful to state, this solid mass continued to shrink, so that at five years after the disease had been cured by Radium only, the jaw had shrunk to nearly its normal thickness and every tooth was living and solidly in place. It is fair to emphasize the fact that no surgical operation short of removing half the boy's jaw, with probability of recurrence, would have been possible at the time when he had the advantage of Radium.

A second equally wonderful case came to St. Luke's two years ago in a young Italian boy, the entire roof of whose mouth, from side to side and from soft palate to front teeth, bulged far down into the mouth with a soft tumor, which also extended upward into the nose. At the Friday surgical clinic I removed a deep, narrow cylinder of the tumor, by inserting a round steel cylindrical punch, from the roof upward an inch and a half into the tumor, and inserting into this opening a small glass tube containing sixty milligrammes of pure Radium. This was left in for one hour, and the operation repeated at another point a few days later.

Acute radium irritation of the mass ensued and speedy solidification of the tumor. This again changed to bone, and now, after two years, the entire palate mass is hollowed out in the central part and completely bony at the sides, and still shrinking without further treatment.

In other words, a perfectly intractable bone disease which must have ended the boy's life long ago, and for which nothing short of extirpating both sides of his upper jaw—a hopelessly impossible operation—has yielded to the new and little understood radium action and saved the life of the lad.

In two other extensive tumors of the pure giant cell, sarcoma type, which filled the antrum of one side of the upper jaw and bled frequently and severely from the nose—which also in both cases destroyed much of the bone so as to bulge out the cheek—the patients entered private rooms at St. Luke's Hospital and were first operated upon to remove all the visible disease. In both cases some recurrence took place, which was then easily treated by radium and produced an immediate retrograde and cure. In one only there remains a small place on the gum, which illustrates beautifully the effect of radium whenever it is applied.

Three cases of the same disease, but reappearing on the gums of

APPEARANCE OF PATIENT FIVE AND A HALF YEARS AFTER RADIUM CURE OF SARCOMA OF THE LOWER JAW.

patients after one or two operations for their removal by other surgeons, have been immediately and permanently destroyed by holding the radium, hermetically sealed in a glass tube, in contact with them for a proper time.

Some three years since I felt that we might almost regard radium as a *specific* cure for this grave form of tumor, but it has not been until of late, where I have seen the final persistence of cure and continued recession of the large bone tumor which replaced the soft destructive sarcoma of the young man's jaw, that I have come to regard it as *demonstrated* that in radium we have a unique force which turns the riotous and destructive growth of cells constituting these tumors into an orderly and normal growth which restores the part to health.

This claim, we can fairly say, is based largely on work done in St. Luke's Hospital and now put forth definitely for the first time.

Out of the hundreds of trial cases where radium has legitimately and hopefully been used in surgical work, I may single out two which have been particularly successful thus far and promise a field of great usefulness. One, a case of large, soft tumor of the side of the face in a young girl, extending from the ear forward over the entire cheek and lower jaw, was a deep *angioma* of the *parotid and cheek,* a congenital birth-mark, perfectly inoperable, as shown by an attempt under ether to operate on it. Into this mass was inserted the small tube of strong radium on two occasions. The result was a degree of irritation of the blood vessels constituting the entire mass of spongy tissue, which sealed up and cured the disease, so that now there is but little difference in the two sides of her face.

This grave form of birth-mark illustrates a type of disease which is now receiving much attention in France, where the claims of Dr. Louis Wickham in Paris have demonstrated the efficacy of radium in curing birth-marks of many varieties, which have been the despair of the surgeon.

Finally, I desire to make here the first report of its use in one of the grave forms of tumor of the parotid gland—what are called mixed sarcoma. More than two years ago a lawyer presented himself with a growth below and in front of his ear, which had progressed rather rapidly during the previous two years, so that it

threatened his life work by its ugliness as well as discomfort. It was the size of half an egg.

The complete surgical removal of such tumors is impossible without destroying the facial nerve and paralyzing one side of the face.

I had hope that, as it was a tumor in gland structure (which I had seen radium efficiently alter elsewhere in the body), we might attack it with expectation of change.

I made several thrusts of a knife deeply into the substance of the tumor at different points and at different times and buried my strongest tube of 60 milligrammes pure radium, hermetically sealed, in the growth. This tube is not larger than a match and an inch in length.

In due time the parts showed the customary heat and tenderness. This usually takes two weeks to develop.

At the end of a month a slight retrograde could be noticed, which progressed until, in a few months, the growing, softish tumor had reduced to a quarter of its original bulk and was a flat, small inert mass of no inconvenience or concern to its owner.

Two years have gone by and the patient has been shown at the Practitioners' Society as a practical cure, up to date, of one of the direful forms of tumors which baffle the surgeon.

I have had two other cases of the same situation and type of more recent date, both showing the same valued action of radium, but not yet ready for report.

It will be asked, "What about its action and its value in treatment of cancer?"

In answer I must truly say that no final estimate of its worth can yet be given.

A large number of cases have been treated and are still under treatment, and for suitable cases to study an increasing extension of its use will be made. The efficiency of our research department of the Pathological Department, so lately endowed and equipped, will enable us, in conjunction with surgical opportunities, during the coming year or two, to make such advance in this field, as will justify the hope of adding one more resource to surgical work, which will be welcomed by all who come to us.

At present one may say that, except in the superficial types of cancer, we have not yet produced cures that are permanent. It

has been demonstrated, however, by microscopic study that in the sphere of influence of a tube of radium buried in a cancerous tumor there has been produced the retrograde change in the adjacent malignant cells which demonstrates the same potency, as has been shown in the sarcoma tumors before mentioned.

We have not yet, by any means, reached the limit of its trial. Indeed, we are probably only on the threshold of its use. We are confronted by many barriers to be overcome—the caution in not overdoing its use and creating mischievous conditions or pain; the need of operating on well established lines of operative surgery first rather than of experimenting, as has been pointed out already; also the inability of asserting which cases are slightly and which intensely malignant cancers before treatment.

There are many cases of tumors of the tongue, for example, which resemble cancer in its early stage, but which are typical papillomata or wart-like growths, some ulcerated and quite large, which always yield to radium and promptly disappear after one or two applications of strong specimens. Such growths, if cut out, may recur, and are regarded as tending to malignancy. In their disappearance from the surface of the tongue, however, they leave a small, innocent, smooth scar, almost imperceptible.

They partake of the character of ordinary warts upon any part of the body, of which scores of examples prove the absolutely certain disappearance with one or more treatments by radium. The same type of growth in other parts, like internal papilloma of the larynx, are apparently cured by radium. This was shown by a chronic recurring mass of growths which had been removed many times by a throat specialist in this city from the larynx of a woman who was sent to me at St. Luke's, for whom I did a tracheotomy and then applied radium to the growths. They soon stopped growing, and after a year her voice was restored. Her immunity continues after more than two years.

One must be frank in saying that there are many cases of cancer of the tongue, of the inside of the cheeks, the gums, the tonsils, the throat, the lips, the œsophagus, the larynx, the pelvic organs and occasionally of the surface of the body, especially where the disease has invaded the bone, which yield only in part and then progress as before treatment. Yet, under microscopic study, the pathological

department reports to me that they are apparently of the same general classification of cancer as are other cases which yield.

It would seem, therefore, that there is a hope that, by continued study and application of experience gained daily, we may expect to find some method of even more efficiently employing this subtle and mysterious power and extend its conquests to deeper and graver cases.

A CASE OF TUBERCULOSIS OF THE PERICARDIUM CURED BY INCISION AND DRAINAGE.*

C. L. Gibson, M.D.

The operative relief of any form of suppuration within the pericardial sac seems to be quite uncommon. Eliot (Annals of Surgery, Jan., 1909) says: "The literature of purulent pericarditis has been admirably collated by Roberts and C. B. Porter. By the former surgeon 37 instances of operation for that condition were tabulated from different sources in 1897 and to that number 10 additional cases, reported in the literature between 1897 and April, 1900, were added by Porter. Eliot, in addition to his own case, reports twenty, "published since Porter's contribution in 1900."

Operations, if any, for the relief of tuberculous pericarditis must be rare, and the fact that a cure was obtained in the case to be reported, gives it special interest. No attempt has been made to run down some remote case; but it is noteworthy that no mention at all is made of tuberculosis in Eliot's contribution.

The history is as follows:

W. B., 26, negro, married, laborer, entered St. Luke's Hospital July 13, 1908, in the medical service of Dr. Theodore C. Janeway. Family history for tuberculosis is negative. Past history is without note, except for an ischio-rectal abscess three months ago. Present illness.—For the past two months has had a heavy cough with slight expectoration. For the past two weeks, dyspnœa has been so bad that he could not lie down, sleeping in a chair. Swelling of the feet noted six days ago.

Physical examination showed: colored man of fairly large frame, fairly well nourished. Breathing with some difficulty and with an expiratory grunt. Heart percusses 1½ inches to right of sternum and six inches to left. Sounds are of poor quality and hard to hear. Considerable bronchitis.

Blood examination.—White blood corpuscles, 8,300; polynuclears, 69%; lymphocytes, 29½%; eosinophiles, 1½%. Blood pressure, 90; temperature elevations up to 102°.

* Paper read before the American Surgical Association, June 4, 1909.

Five days after admission, noted: pericardium was aspirated in fifth space four inches to left of median line, eighteen ounces of opaque yellowish fluid was obtained. Before aspiration, heart dullness extended five inches to left in third space, six and a half inches to left in fifth space, an inch and a half to right in the third space and two inches to right in fourth space. Area of cardiac dulness was greatly diminished by the aspiration. Blood pressure in early part of aspiration was 80 mm., subsequent to aspiration 95 mm.

The report of the pathological laboratory on the nature of the fluid was negative as regards etiology.

The next day the patient's general condition showed improvement; but there was a rising temperature and rapid increase of the cardiac dulness. Dr. Janeway kindly asked me to see him with a view to operative relief, to which I readily agreed as necessary to avert a fatal result.

Operation July 19, 1908. Attempts at local anesthesia were resisted by the patient; but it would be perfectly feasible to perform the simple operation, done in a patient of ordinary self-control. Chloroform was given to the point of producing unconsciousness, and followed by ether.

Incision in the long axis of the left fifth cartilage which, with a bit of the rib, was removed to the extent of two inches; subsequently the fourth cartilage was removed to obtain the freest possible access. The presence of the pleura or that legendary bugbear, the internal mammary artery, did not have to be considered. The distended pericardium was seized between two Kocher clamps and a two finger incision gave issue at once to a gush of pus. Probably a quart escaped, but as the pulse weakened perceptibly, the flow was checked by blocking the exit with appreciably good effect. The sac must have contained perhaps three quarts. The pericardial edges were sutured to the soft parts and a rubber drainage tube passed into each lateral cul de sac.

At the close of the operation the patient was in good condition, with improved quality of pulse.

While remaining pretty sick for some days, he improved steadily. The drainage was profuse and sufficient. The tubes were removed in a week. September 9, 1908, transferred back to the medical side. Wound entirely healed, without sinus.

Since the operation his general condition has been poor, and he has been readmitted to the hospital several times. He is now an inmate of the tubercular ward, the presence of the tubercular process in his lung now being manifest, although tubercle bacilli were not found till recently, notwithstanding almost daily examination of the sputum.

The pericardial cure has persisted, evidences of an adhesive process being manifest.

While no positive laboratory findings exist to confirm the diagnosis,

there is the negative evidence of failure to cultivate other pus producing organisms. The process did not come as a sequel to rheumatism or pneumonia. It is not the incidental pericarditis that is seen sometimes with extensive pulmonary tuberculosis, as the process in the lungs now present did not develop till six months later. The character of the pus evacuated was obviously of the tubercular variety in the opinion of all who saw it. The leucocyte count with normal polynuclear percentage would also strongly favor a tubercular rather than one of the usual pyogenic infections.

That such a severe process can result in a cure in the face of an advancing tubercular diathesis is certainly remarkable, and the experience here obtained should justify us in applying surgical measures to this condition.

UNUSUAL CASES OF PROSTATIC DISEASE.—1. SARCOMA OF PROSTATE.—2. CANCER OF THE PROSTATE IN A SUBJECT OF THIRTY YEARS.—3. AN UNUSUALLY LARGE PROSTATE.

C. L. Gibson, M.D.

1.—Sarcoma of the prostate.*

This disease is fortunately rare, as so far it has defied all resources of the surgical art to relieve it. It is not quite so rare as a perusal of the literature would seem to show because the various statistical observations of accepted value have very wisely refused to admit cases not backed up by a definite microscopical examination, as the great majority of these cases are unamenable to surgical treatment, and autopsies, particularly in this country, difficult to obtain, suitable material for examination is unavailable.

When I reported my first case in 1904 to the American Association of Genito-Urinary Surgeons, I could only find one extensive tabulation of authentic cases (Socin, 1902, Deutsche Chirurgie), twenty-four in all. Powers (Transactions American Surgical Association, 1907) would accept only twenty-three cases, including his own case and

* Case reported at the meeting of the American Association of Genito-Urinary Surgeons, May 31, 1909.

mine. The latest observation by Proust (1908, Annales des Maladies des organes genito-urinaires, 15 Mai, 1907) tabulates forty-eight authentic cases. This list is obviously incomplete, however, including neither Powers's case nor mine.

It is not necessary, however, to demonstrate by more extensive literature references that the disease is uncommon. We should, however, be on the alert to discover its existence at an early stage, using, if necessary, extraordinary expedients, such as exploratory incisions in order to remove the disease radically at a period when it is confined to the prostate. As most of the cases occur in young individuals, any unusual size of the prostate or otherwise unexplainable obstructive symptoms should bring the possibility of this tumor to our minds.

The history of my second case is as follows:

G. G., 36, married, Italian, laborer, admitted Nov. 10, 1907, kindly referred by Dr. M. J. Echeverria.

There is no history of venereal disease. Present illness.—About two months ago began to notice pain in the lower abdomen, somewhat more marked on the right side; pretty constant with occasional exacerbations. Urination is frequent, particularly at night. Has trouble in starting stream and has to strain to empty the bladder. Also some scalding sensation. The urine is often cloudy but the presence of blood has not been observed. No urethral discharge. Loss of weight and strength; constipation.

Examination shows an abdominal distension below the umbilicus. A mass can be felt extending from the umbilicus well down into the pelvis, hard and not freely movable. There is a retained left testicle.

Rectal examination shows the axis of the rectum deflected to the right. An irregular mass, size of a fist, hard and immovable, replaces the prostate. A soft catheter passes easily, withdrawing an ounce of residual urine.

Slight elevation of temperature and pulse.

Blood examination: Leucocytes, 9,900; polynuclear, 80%.

Urine examination varied, but usually showed blood and albumin.

Nov. 15. Exploratory operation to determine whether radical removal might be feasible; but it was found that the mass involved the other pelvic contents to so great an extent as to make a radical removal impossible. Fragment removed for microscopic examination. Supra-pubic drainage for prophylaxis of developing obstruction.

The growth of the tumor was very rapid, but the patient was now free from pain. Coley fluid used without appreciable result.

Died in March, 1908, of general exhaustion. The tumor mass then nearly filled the whole abdomen.

Pathological report by Dr. F. C. Wood:

"Macroscopic examination: Specimen consists of several small pieces of tissue removed from tumor of the prostate."

Microscopic examination: Sections show a small round cell sarcoma, which is moderately vascular. The cells are regular in outline, not closely packed together, but separated by considerable inter-cellular stroma. Mitoses are frequent.

CARCINOMA OF THE PROSTATE.

The case is of importance owing to the relative youth of the patient. In the older literature one finds references to cancer of the prostate in children, but these are undoubtedly cases of sarcoma. Cancer of the prostate comes under my observation frequently, but all previous experience was with patients at least twenty-five years older. The case is also of some significance as regards the contributions which have lately tended to show that not only does cancer occur more frequently than formerly, but that we are seeing it develop earlier in life.

Owing to the patient's age, thirty years, and the great size attained by the rapidly growing tumor, the diagnosis was obviously sarcoma, and would undoubtedly have been so recorded from the clinical observations. The microscopic findings show, however, how unwise it is to draw final conclusions in the absence of competent microscopical examination. For the latter to my astonishment demonstrated a carcinoma.

The case is interesting as showing the life history of such a process. The patient had been under my care three years previously for an acute gonorrhœal abscess of the prostate operated on by the extra urethral method with most satisfactory and prompt healing. There had never been any genito-urinary manifestations till the development of the present trouble. Curiously enough like the case of sarcoma of the prostate just described there was also an undescended left testicle. There does not seem to be any relation between this circumstance and the formation of the malignant growth; but in searching for etiological factors of tumor development we should bear in mind all such possible links in the very circumstantial chain of evidence.

History.—The present illness dates back nine months when simultaneously with the appearance of a tumefaction of the lower abdomen urination was accompanied by sharp pain in the prevesical region and

in the end of the penis, worse at the beginning of the act, absent at other times. Also a good deal of pain in the left hip. Blood has never been noticed in the urine.

Examination showed the presence of an oval tumor occupying the lower abdomen, quite hard, painless, somewhat irregular surface. Bimanually through the rectum, its size was made out to be nearly that of a regulation football. It occupied the site of the prostate, nearly filling the transverse diameter of the pelvis. Catheter passed into bladder, evacuating perfectly clear urine.

The diagnosis and prognosis were perfectly clear, but the patient and his family were desirous that an exploratory incision should be made to exhaust all possibilities. A small opening of the peritoneum revealed that the mass occupied the site of the prostate, the bladder being pushed ahead and apparently not directly involved in the process. Small fragment removed for examination.

The course was very rapid, the patient dying four months after exploration. No autopsy.

Pathological report by Dr. F. C. Wood:

Macroscopical—Tissue consists of a small irregular mass removed from bladder wall.*

Microscopical—Section is made up of fibrous tissue, a small amount of muscle and a large amount of epithelial cells. The connective tissue is irregularly arranged in bands and forms a very delicate support for the cells. These cells are epithelial in character, very irregular in size and shape, closely packed together, have mitotic fissures and are infiltrating into the fibrous tissue.

UNUSUALLY LARGE HYPERTROPHIED PROSTATE SUCCESSFULLY REMOVED FROM A PATIENT OF EIGHTY-FIVE YEARS.

Mr. B. gave a history of increasing prostatic obstruction for last six years. Several attacks of acute retention requiring aspiration of the bladder over the pubes as no instruments could be passed. Three years ago another surgeon had performed supra-pubic drainage since which he had never passed a drop of urine naturally. His condition on admission was truly pitiable, "swimming" constantly from his uncontrolled vesical opening. By rectum the limits of the prostate could not be made out, being much greater than any previously coming under my observation.

The family urged me to do "something" with an insistence which

* The bladder was not opened. The fragment removed represents the extension of the process from the prostate.

gave rise to the suspicion that they believed euthanasia producing results to be the surgeon's function.

The problem was indeed perplexing. On the one hand I felt despite the patient's age if I could perform my usual quick operation of perineal intra-urethral enucleation with its minimum of operative risk I could pull him through as well as I had patients even older. The technical difficulties of this particular operation seemed insurmountable, when I remembered my experience with my previously largest prostate performed years ago by the combined supra-pubic and perineal routes. This was a six ounce prostate.

I operated under ether anesthesia and by the hardest kind of work, the patient being stout, finally delivered this mammoth prostate piecemeal, the operation taking about twenty minutes, somewhat more than double the time ordinarily requisite.

The old gentleman was a bit shaky for a day or two; but was never in any serious danger. He finally healed up after many intercurrent troubles, and at the present day remains in good health, a year after operation. The first urine he had passed naturally in three years was voided ten days after operation, and the expression of gratified surprise on the old gentleman's face on realizing this phenomenon was one of the most wonderful sights I have ever seen.

The dry prostate weighs nine ounces. In the fresh state it probably weighed a good bit more. It is the largest prostate I have ever known or heard of being removed by perineal intra-urethral enucleation.

COMBINED TUBERCULOSIS AND CARCINOMA OF THE STOMACH: PARTIAL GASTRECTOMY.—RECOVERY.

M. M. Case No. 70055.

Patient aged 40, Irish, porter by occupation; admitted May 2, 1907. Discharged cured, May 30th, 1907.

Family History.—One brother and sister died of pulmonary tuberculosis.

Past History.—Lues 16 years ago; treatment for two years. Gonorrhœa 4 times. Operated on for fistula in ano 4 years ago. Drinks ten to fifteen whiskies a day; smokes to excess. Has had a "stomach cough" for a year or more.

Present History.—About five months ago began to complain of a dull pain in the region of his stomach; accompanying this was a moderate amount of gaseous distension; the pains and distension have gradually increased. Four months ago began to vomit, and this has persisted. The vomiting takes place 3 to 4 hours after eating;

the vomitus is large in amount, consists of the contents of the stomach and undigested food, at times contains food that has been eaten 3 to 4 days previously; has vomited coffee-ground material. Constipation marked; bowels have not moved for seven days. Has lost 30 lbs. in 3 months, and is rapidly growing weaker.

Chief Complaints.—Pain and vomiting.

Physical Examination.—Man, medium frame, greatly emaciated, weight, 100 lbs. Skin and mucous membranes anæmic; superficial glands enlarged.

Chest: Possible old tuberculous lesion at right apex.

Heart: Normal.

Abdomen: Flat, with visible peristalsis; on deep palpation a hard, firm mass about the size of a walnut was found in the epigastric region to the right of the median line; is movable, moves with respiration and can be fixed with hand. Lower border of stomach two fingers' breadth below the umbilicus; succusion splash present three hours after the taking of food.

Rectal examination: Negative.

Blood Cells: Normal; hæmoglobin, 70 per cent. Urine normal.

Examination of stomach contents (Ewald's test breakfast): Total acidity, 49; Free HCl, 20; loosely combined, 13; lactic acid present; starch poorly digested; mucus abundant; no blood; no pus; sarcinæ ventriculi and Boas Oppler bacilli present.

A full evening meal was given. The contents expressed next morning contained partly digested meat and some raisins which had been given four days previously. The contents had a very offensive odor.

Diagnosis.—Carcinomatous stricture of pylorus with dilatation of stomach.

Operation.—May 5, 1907. Dr. Lyle.

Partial gastrectomy, with gastro-jejunostomy, according to Billroth's second operation.

The portion removed included two inches of the duodenum, the pylorus, and the stomach to the Hartman-Mikulicz line, with the corresponding glands.

Pathological Report, by Prof. Francis C. Wood.

Diffuse carcinoma of stomach; tuberculosis of sub-mucosa.

Macroscopical examination:—The specimen consists of a complete section of pylorus, plus a portion of the stomach 8 c. m. in length. At the pyloric end the wall is thickened to 1 c. m. by dense tissue, which has a uniform light colored cut surface.

Microscopical: Sections show the mucous membrane in places to be entirely gone; the submucosa to be infiltrated with small round cells. The muscular coats have long rows and small groups of gland cells situated between the muscular fibres. The groups of cells are to a very marked degree surrounded and infiltrated with numerous

small round cells. We also find two or three areas of coagulation necrosis, one of which contains well-formed giant cells and some epithelial cells. Glands.

The patient made an uneventful recovery. There was no shock, and the highest temperature was 100 2/5. He left the hospital May 30, 1907.

Subsequent History.—July 2, 1907. Patient has gained 45 lbs., is working, carrying trunks, etc., feels well and strong. Eats and digests well. Calmette's ocular test for tuberculosis negative.

September, 1907. Has had an attack of diarrhœa after partaking of a generous meal of corn beef and cabbage. Attack controlled by the administration of dilute HCl with meals.

February, 1908. Patient continues in good health. Does not react to tuberculin. Has been drinking ten to twelve whiskies a day without any apparent effect.

March 28, 1909. Patient is in good health. No signs of recurrence. Ewald's test meal given. At the end of one hour the stomach was found to be empty. Contents expressed one-half hour after test breakfast gave the following results on chemical examination: No Free HCl. Total acidity, 1.8; no lactic acid. No Boas Oppler bacilli. No sarcinæ ventriculi. No blood. Very little mucus.

The combination of tuberculosis and carcinoma of the stomach is very rare. The reported cases are few in number, *and are taken from autopsy records.* I have been unable to find any recorded operative cases. The interesting point in the case, beside the association of these two supposedly antagonistic lesions, is the sequence of the lesions. From the clinical and pathological evidence it seems probable that the original lesion of the stomach was a tubercular ulcer of the pylorus, secondary to possible old lesion of the right apex. From this tubercular ulcer a diffuse carcinoma developed. After the operation repeated examination of the sputum failed to reveal any tubercular bacilli. Calmette's ocular reaction, Koch's tuberculin reaction and Von Pirquet's cutaneous reaction have been applied during the last year and all have proven negative. Unfortunately they were not applied before the operation, as the condition was not suspected.

LINITIS PLASTICA OF THE STOMACH (BRUNTON)—GASTRO-JEJUNOSTOMY.

The patient, B. B., was transferred from the medical service of Dr. Janeway to the surgical service of Division B.

Diagnosis.—Partial volvulus of stomach with abdominal adhesions.

Med. No. 70436. Admitted June 11; transferred to surgical side, July 23, 1907.

History.—Woman, single, aged 40; Swede; occupation, cook.

Family History.—Father had kidney trouble and rheumatism. Three children had rheumatism, two had cardiac complications.

Past History.—Rheumatism at 19, in bed one month; second attack seven years later, in bed 8 months with cardiac complications; third attack two years later, in bed five weeks; last January was in bed three weeks with an attack of rheumatism. This was followed by an otitis media, which lasted four weeks. Often has nocturnal dyspnœa, so that she has to sit up in bed to breathe, and suffers from pain, palpitation, dizziness and syncope. Menses irregular and painful. No history of syphilis.

Present History.—Five days ago had sharp cramp-like pains in the left lumbar and inguinal regions, radiating downward and inward into the thigh. These pains persisted for three days, then disappeared, to reappear on the second day after; felt nauseated, but did not vomit. These attacks come at irregular intervals and seem to bear no relation to the taking of food. Complains of tenderness at a point just to the left of umbilicus.

Urination: Some increased frequency, somewhat cloudy; otherwise negative.

Bowels constipated, appetite poor.

Physical Examination.—Patient, woman, weight, 98 lbs.; large frame; poorly nourished; skin and mucous membranes anæmic; tongue clean.

Pulse: Irregular and of poor force.

Heart: Apex in 6th space, 4½ inches to left; action somewhat irregular. There is a harsh, blowing, systolic murmur heard at the apex; a second one heard over the pulmonic area. Second pulmonic accentuated; right border one inch to the right.

Lungs: Clear.

Abdomen: Tenderness and slight muscular spasm one inch down and to the left of the umbilicus. No mass made out. Liver enlarged. Spleen not felt. Right kidney palpable. Rectal and vaginal examination negative.

Extremities: Superficial glands enlarged.

Blood: Leucocytes, 11,532; polynuclears, 74 per cent.; lymphocytes, 26 per cent.; Hb., 70. Urine normal.

Patient was examined in hot bath, and a sense of muscular resistance was experienced in the upper left quadrant.

Tuberculin injected. No reaction.

June 12. Patient still complains of severe attacks of pain in the epigastric region, has several attacks a day—no relation to the taking of food.

June 19. Attacks of pain continue—several every day. At times

the pain radiates upward into the left axilla and across the abdomen. The attacks are growing more severe.

Stomach Analysis, June 4, 1907: Total acidity, 56; free HCl, 20; no lactic acid; no Boas Oppler bacilli; no blood.

As the condition was steadily growing worse, she was transferred to the surgical side for operation, the diagnosis being gastric adhesions.

Surgical, No. 70840.

Operation by Dr. Lyle, July 27, 1907. On opening the abdominal cavity a mass of adhesions was encountered and the exact relation of the parts could not be made out. On separating the adhesions, it was found that the stomach was half rotated to the left, and the pylorus was firmly fixed by a short, dense, fibrous band to abdominal wall one inch and a quarter to the left of the umbilicus; there was a corresponding twist in the great omentum. The stomach itself was about half the size of the fist, puckered and scarred. Over the region of the pylorus and lesser curvature the wall was markedly thickened and congested, suggesting a possible old ulcer or a new growth. A portion of tissue was removed for examination. Glands enlarged. It was decided to shorten the gastro-hepatic ligament to prevent the recurrence of the rotation and to do a gastro-enterostomy. During the shortening of the ligament, the patient's condition became serious, so the gastro-enterostomy was abandoned and the abdomen closed. The patient was returned to the ward. From the second day on she made an uninterrupted recovery. She left the hospital on the fifteenth day, apparently cured of all her symptoms.

The examination of the tissue removed showed granulation tissue, young connective tissue with areas of chronic inflammation. Nothing pointing to malignancy. Patient was seen 8 months later, when she appeared to be well and strong.

Patient was again admitted to the hospital August 20, 1908. Surgical, No. 74723.

History.—Since leaving the hospital she has been perfectly well provided she limits her food in quantity. The quality does not seem to make any difference. Five weeks ago began to vomit about half an hour after eating. The ingestion of food began to cause considerable pain, which pain was referred to the old scar. Can only take small quantities of food. Pain is sharp and cramp-like in character and radiates down the left leg to the knee; has gradually grown worse, and is very severe at the present time. Some burning in throat and eructations of gas. Has lost 25 lbs. in 8 months. Has grown quite weak. Occasional attacks of dizziness; no symptoms of loss of cardiac compensation. Stomach contents show a slight increase of total acidity and free HCl on the first examination; the second a loss of acidity and free HCl.

Abdomen: Concave, soft and relaxed. There is a firm linear scar, three inches long, half way between ensiform and the umbilicus. Some tenderness in the epigastric region. No mass made out. Outline of stomach could not be mapped out. Six ounces of water distended the organ and gave considerable distress.

Diagnosis.—Possible gastric adhesions. With the previous history in view, it was thought advisable to place the patient under medical treatment for gastric ulcer before proceeding to operation. Patient put on Lenhartz' regimen. There was no improvement.

Operation September 9, 1908. Dr. Lyle.

On opening the abdominal cavity, a small, shrunken and scarred stomach was found covered with adhesions—some of these dense, others thin; they extended from the anterior surface to the abdominal wall and from the lesser curvature to the under surface of the liver. The lesser curvature was represented by a dense, scar-like mass, radiating from which were folds of thickened tissue and adhesions. The distance from the pylorus to the œsophageal opening, measured along what remained of the lesser curvature, was less than one-half inch. The stomach was contracted to about the size of a goose egg, and was almost circular in shape. The stomach wall seemed to be twice the normal thickness.

A no-loop posterior gastro-jejunostomy was performed; considerable difficulty was experienced, due to the smallness of stomach and the thickness of its walls. The patient made a prompt and rapid recovery and was out of bed on the thirteenth day.

Since leaving the hospital she has been under careful observation, and is well and strong. Has gained 35 lbs., and has worked steadily since leaving the hospital. The stomach contents still show a diminished acidity.

At the first operation the condition was not recognized, and it was thought to be a case of ulcer of the stomach with the formation of numerous perigastric adhesions, accompanied by accidental rotation of the stomach. The walls of the stomach at that time were thickened and scarred. The freeing of the adhesions and shortening of the gastro-hepatic ligament gave relief for almost a year.

At the second operation the uniform increased thickness of the walls and the marked diminution of the size of the stomach, plus the scarring, showed that we had to deal with something else than a contraction following a simple ulcer. In the causation of this case we have a combination of two factors, each of which has been given as cause of the disease. We have a well-marked history of chronic passive hyperæmia from cardiac insufficiency (the result of repeated attacks of rheumatism), and a strong possibility of multiple peptic ulcers. The chronic condition, plus the irritation set up by the ulcers, would undoubtedly be a sufficient stimulus to start

changes in the connective tissue elements of the stomach, and thus lead to marked general contraction; with the contractions would come of necessity a thickening of the walls, until we would find a rigid organ with greatly diminished lumen and thickened walls, as found in this case.

NOTE.—Since the preparation of this report the patient has had four distinct attacks of toxic erythema, due to the taking of meat. These attacks can be controlled by the addition of some dilute HCl and pepsin, showing that her stomach digestion is below par for digestion of meats.

ACUTE POST-OPERATIVE DILATATION OF STOMACH. RECOVERY.

Patient, J. R. No. 74355. Referred to surgical service of Dr. Gibson by Dr. Calhoun.

Operation, July 21, 1908. Dr. Lyle. Patient was operated on for a large right inguinal hernia. The operation was done under local anæsthesia (novocain, 2 per cent., diluted with adrenalin chloride, 1-1000, in the proportion of 5 parts of novocain to one part of adrenalin). The combined infiltration and intraneural method was employed. Amount used, 2.5 cc. The hernia was descended into the scrotum and contained a large amount of omentum. In order to reduce the hernia and guard against a future recurrence, it was decided to remove the redundant portion of the omentum. This was carefully done, causing the patient no discomfort. The mass removed weighed 4 lbs. 2 oz. The hernia was repaired according to the Bassini method. The patient was returned to the ward in excellent condition. He was allowed some tea and toast, which is the routine for cases that have been operated under local anæsthesia. About one hour later patient began to complain of pain and distention in the epigastric region. The usual carminatives, enemata and stupes failed to give relief. The patient vomited a large quantity of brown watery colored fluid; this gave some temporary relief, then the distension began to increase rapidly. The lower border of the stomach seemed to be about 3 inches below the umbilicus. The patient became extremely restless, with a rapid running pulse of 135-50, and soon passed into a condition of partial relapse. Repeated stomach washings combined with postural changes gave temporary relief, large amounts of fluid and great volumes of gas escaping.

Eight hours after initial attack, the lower border of stomach was thought to be in the right iliac fossa. Next morning the distension began to decrease, and all the acute symptoms disappeared within the following forty-eight hours. With the decrease of the distention,

the patient's condition soon returned to the normal. He was discharged from the hospital four weeks later, and cautioned to remain under observation, as the hernial scar had been put to a very severe test.

This case is of interest, as it shows a possible cause of acute dilatation. In all probability the removal of so large a portion of the omentum profoundly altered the circulation, and possibly the nervous mechanism, of the stomach, thus causing a temporary muscular paralysis. One cause that is sometimes given for this condition can be ruled out—the toxic action of ether or chloroform on the stomach, and I think also the factor of rough handling of intestines and stomach. The operation was done under local anesthesia, and great care was taken to avoid all unnecessary handling and traction. There was no dragging on the omentum.

TYPHOID PERFORATION: SUTURE UNDER LOCAL ANÆSTHESIA.—RECOVERY.

Miss E. C. Transferred from the service of Dr. Meara to the surgical service of Dr. Gibson, with the diagnosis of typhoid perforation.

The patient, a young girl of 20, was in the twenty-third day of her disease, the temperature had been coming down gradually for four days. In the afternoon she was seized suddenly with a sharp, knife-like pain in the iliac fossa; the pain was accompanied with exquisite tenderness and muscular rigidity of the right half of the abdomen; this was most marked at McBurney's point. She was in a state of partial collapse.

Blood count taken three days before perforation—Leucocytes, 4,600; polynuclears, 66.5 per cent; lymphocytes, 33.5 per cent. At time of perforation: Leucocytes, 15,400; polynuclears, 50 per cent.; lymphocytes, 49.5 per cent. One hour later: Leucocytes, 14,600; polynuclears, 87 per cent.; lymphocytes, 13 per cent.

Operation 4½ hours after perforation.

Under local anæsthesia (novocain, 2 per cent.) the abdomen was opened along the outer border of the rectus and the ilium drawn into the wound. It was red and congested and showed several ulcers; 10 inches from the junction of ileum and cæcum a pin-point perforation was found. This was closed with purse-string suture of linen thread, reinforced by a running Cushing suture of fine chromic gut. Cultures taken from the cloudy serum present in the abdomen. Abdomen closed without drainage. Patient suffered no pain at all during the operation and returned to ward in good condition. She

made an uninterrupted recovery, with the exception of slight superficial infection. Discharged cured five weeks later.

Culture showed typhoid bacilli.

DIRECT BLOOD TRANSFUSION.—RECOVERY.

Case No. 74667. Admitted August 14.

M. B., U. S., negress. 30 years, laundress, was transferred from the medical service of Dr. Janeway to the surgical service of Dr. Gibson. *Diagnosis.*—Ulcerative colitis with intestinal hæmorrhage.

History.—About one year ago began to have a constant diarrhœa, three to four loose movements a day, containing mucus and blood. Was treated at St. Luke's in 1907. Discharged cured, remained well for three months, then the bleeding began again. For the last four weeks the condition has been severe—three to four slimy movements with numerous clots, and at times bright red blood. Vomiting present after each meal. For the past two months she has had cramp-like pains, referred to left inguinal region. These attacks were always followed by bloody stools. Has been growing steadily weaker and is suffering from dyspnœa.

While under observation in the medical wards has grown steadily worse; considerable bright blood in the stool; local measures of no avail. Weakness, prostration and dyspnœa marked. Hæmoglobin, 12 per cent. Patient transferred to surgical service, Division B, for direct blood transfusion.

Physical Examination.—Fairly well nourished negress; skin and mucous membranes extremely anæmic. Pupils negative. Superficial lymphatics not enlarged.

Heart sounds weak. Soft blowing systolic murmur heard over the aortic area. Lungs normal.

Abdomen: Soft. No masses made out. Complains of tenderness in the left inguinal region.

Vaginal Examination.—Uterus enlarged. retroverted. On the posterior wall there is a moderate sized fibroid wedged between uterus and sacrum. Left tube enlarged and tender.

Rectal Examination.—On the anterior rectal wall two nodular masses are seen about six inches from anus; just above the fold of mucous membrane caused by these nodules is a small round ulcer with a dark necrotic base and bright red edges.

A diagnosis of perforation of the rectum, caused by either the presence of the fibroids or the discharge of a pyosalpinx was made. Operation by Dr. Lyle.

All local means of treatment failed, and as operation was out of the question, due to condition of the patient, a "direct transfusion" of blood was made. The husband was the donor, his blood

having been previously tested for hæmolysis. The left radial of the husband was united to the basilic vein, according to the Crile method. The total estimated time of flow was thirty-five minutes. Clotting occurred twice and required a re-anastomosis. There was marked improvement in the patient's condition—much more marked than the blood count would indicate. Before transfusion: R. B. C., 1,132,000; Hb., 8 per cent.; W. B. C., 66,000. After transfusion, R. B. C., 1,624,000.

The hæmoglobin remained apparently unchanged until the next day, after that there was a steady increase; accompanying this there was a corresponding increase in R. B. C. At time of operation for fibroids and tube, the R. B. C. were over 3,500,000, and the Hb., 70 per cent. When discharged the R. B. C. were 4,300,000. Hb., 79 per cent.

The bleeding stopped immediately after transfusion and has not recurred.

On the second day after the transfusion some megaloblasts appeared in the blood, showing that the blood making functions of the body were being stimulated. From the observation of this case it would seem that the result obtained was out of all proportion to any good that could have been obtained from the mere transfusion of R. B. C., but that possibly the new serum in some way stimulated the worn out blood-making function of the patient.

Forty days after the transfusion a myomectomy and left salpingectomy were performed. It was found that the fibroid on the posterior wall by pressure had ulcerated through the rectum and had caused the hæmorrhage. The patient made an uneventful recovery and was discharged from the hospital twenty days later.

BIER'S VENOUS ANÆSTHESIA.

Two cases operated on under venous anæsthesia (Bier).

Case I.—From the surgical service of Dr. Gibson. F. R. B. Admitted, August 11, 1908; discharged, September 1, 1908. Gunshot wound of leg. Exploration and removal of bullet.

History.—Patient was accidentally wounded by 38 calibre bullet. It entered the outside of the calf 4 inches below the knee. Probing failed to locate the bullet. Skiagraph shows the bullet apparently lodged between the tibia and fibula, posterior to both bones.

Patient is a heavy drinker, is extremely nervous, and on the verge of delirium tremens. General anæsthesia contra-indicated because of nervous condition.

Surgical Condition.—On the outer side of the left leg, four inches below the knee, there is a bullet wound, the tract passing inward

and downward for one and a half inches. A moderate sero-purulent discharge. The bullet cannot be felt by probing. Skiagraph shows the bullet between the tibia and fibula on a plane posterior to the tibia.

Operation August 13. Extraction of bullet under Bier's venous anæsthesia. By Dr. Lyle. Leg elevated and rendered bloodless by an Esmarch bandage, then the portion below the wound loosened, that above held fast. A second Esmarch was applied from the toes to within two inches of the wound. An operative field blocked above and below by Esmarch bandages was thus formed. A superficial vein in this area was selected and exposed under local infiltration (1 per cent. novocain). The vein was ligated proximally, cut across, and the remaining blood stripped from the veins. Then a canula was inserted into the distal end of the cut vein and 35 cc. of 1/4 per cent. novocain injected. This was the quantity required to distend the veins in the operative field. In a few moments complete anæsthesia was obtained. Three incisions were required to locate and remove the bullet. Considerable handling of the tissues took place. The tibial nerve was exposed during the operation, and it could be handled without the patient being conscious of it. Pinching, digging, etc., gave no pain. The veins were washed out with normal salt solution, 180 cc. being used. The upper bandage was then loosened enough to allow of arterial flow, but not the venous return. In this way the remaining novocain was forced out by the incoming blood. The lower bandage was removed, then the upper; the vessels were ligated and the wound closed.

The anæsthesia was complete in all tissues and the field was bloodless. Below the lower bandage there was a secondary sensory anæsthesia, which made its appearance about ten minutes after the original injection. Five minutes after removal of lower bandages sensation began to reappear in the foot. All traces of anæsthesia disappeared within 10 minutes of removal. The time of operation was fifty-five minutes. The patient suffered no pain whatever other than the discomfort of the Esmarch bandage. The pulse varied from 92 to 96. No untoward after-effects. Discharged cured September 1.

Case II.—C. D., 75304. Old ununited fracture of the head of the second metatarsal bone, with dislocation upward and inward of the phalanx. Amputation of second toe, with resection of the metatarsal bone, under Bier's venous anæsthesia.

The patient has a tubercular lesion of right apex. General anæsthesia contra-indicated. The same technique was used as in the previous case, with the exception that there was only one blocking bandage, and that was placed 1 inch above the ankle. The operation lasted twenty-five minutes. There was complete surgical anæsthesia in all tissues. The return of sensation after the removal

was very rapid. Before the operation patient's pulse was 100, during the operation it fell; the average rate for twenty-five minutes was 78 to 68.

Amount of novocain injection, 115 cc. of 1/4 per cent. 90 cc. of salt solution used in washing veins. The patient made an uneventful recovery.

SURGICAL RELIEF OF TIC DOLOUREUX (TRIFACIAL NEURALGIA).

ROBERT ABBE, M.D.

During the past ten years at St. Luke's Hospital many cases have been relieved of the suffering from this terrific pain, which comes, as the patients express it, in "crashes" or "shocks," through the cheek, temple, jaw or roof of the mouth with constant recurrence, increasing in frequency for months and years until they submit to any operative work for relief.

Fortunately, surgery has given to the world during recent years several successful methods of cure.

Until twelve years ago operation on the Gasserian ganglion at the base of the brain was regarded as the acme of surgical procedure to insure success and permanent relief.

In St. Luke's Hospital it was then demonstrated that a far less dangerous, and it was hoped equally permanent, relief would follow the intra-cranial resection of a small piece of the diseased nerve (without entering the brain) and the interposition of a square piece of sterile gutta-percha tissue to prevent reunion of the nerve ends. The first patient so treated in St. Luke's, soon after our moving up to our present site, remained absolutely well for twelve years. Then a slight return of pain brought him again from his farm to our Hospital before waiting for more severe attacks, which had nearly caused him to take his life before the former operation. At the second operation it was of much interest to discover that a fine thread of nerve had regenerated in place of the large one originally cut away, which had been more than an eighth of an inch in diameter. This had gone past the edge of the interposed barrier and joined the lower

end. In this we see demonstrated the marvellous reparative power of nature in the face of obstacles. Some twenty cases in all have been cured by this method, which is most brilliant in instant results, and not one case has died or failed. Three, however, have been re-operated on for recurrence after three to twelve years, and in each the two or three filaments of regenerated nerve have been demonstrated before being cut out.

The last year or two an additional security against recurrence has been adopted, namely, the openings of exit from the skull, foramina rotundum and ovale have been plugged tightly with warm, crumpled gutta-percha tissue, which packs solid in the canal, and upon this is laid the square piece of gutta-percha, upon which the brain settles and keeps it as an impermeable barrier to reunion.

In not one of the twenty cases has this sterile tissue failed to remain in the place given it at operation. And at the three re-operated on after several years the dark tissue has always been seen sandwiched between the original dura mater and a new layer, which strips up from the bone at operation just as the original did.

The modification of plugging the foramina as well as interposing a flat piece of the same tissue upon these, which seems to the writer a beautiful addition to the technique of this safe and satisfactory operation, was suggested and used by Dr. Samuel Mixter, of Boston, as an improvement.

It is fair to say that recent hopes have been raised by Dr. Schlosser, of Germany, that cases heretofore subjected to operation may get relief by injection of a thimbleful of alcohol at the nerve roots where they emerge from the skull.

A large experience with this method by Dr. Kiliani, of the German Hospital, who studied with Dr. Schlosser, led the author to ask him to demonstrate the method at our Friday clinic upon two patients, who have been quite well relieved thereby up to date. The technique of the procedure is by no means so simple that it should be undertaken by one not trained to surgical work and emergencies, but when carefully conducted gives promise of much helpfulness, with a minimum of danger.

Three specially interesting cases of disease of *the liver* among the score or more that have called for operation during the year at St.

Luke's in my service will be briefly narrated; only the essential points of surgical interest being given.

1st.—Septicæmia from irritation of large gall stones in the common duct in a patient with grave heart disease. Successful operation under local anæsthesia. Final recovery after secondary operation to unite gall bladder and colon, also under local anæsthesia.

An elderly woman who was slightly jaundiced had for several weeks suffered violent chills, followed by sweating and fever ranging up to 103½, 104½. These recurred two or three times each week, but with much irregularity. She had a loud, blowing aortic murmur, and possible septic endocarditis was suspected. A careful culture of the blood drawn from her veins showed no streptococcus or bacteria. The laboratory reported also no malarial organisms. The possibility of pyæmic condition from multiple abscesses of the liver was suspected, but the leucocyte count, verified several times at the laboratory, showed a low leucocytosis (12,000), which precluded serious pyæmia from abscess.

By inferential diagnosis, as well as exclusion, therefore, the patient was regarded as suffering from septic absorption from erosion at the point of irritation of a gall stone in the common bile duct.

Examination of the patient's side had shown no enlargement or tenderness of the gall bladder, such as would have been present in abscess of the gall bladder.

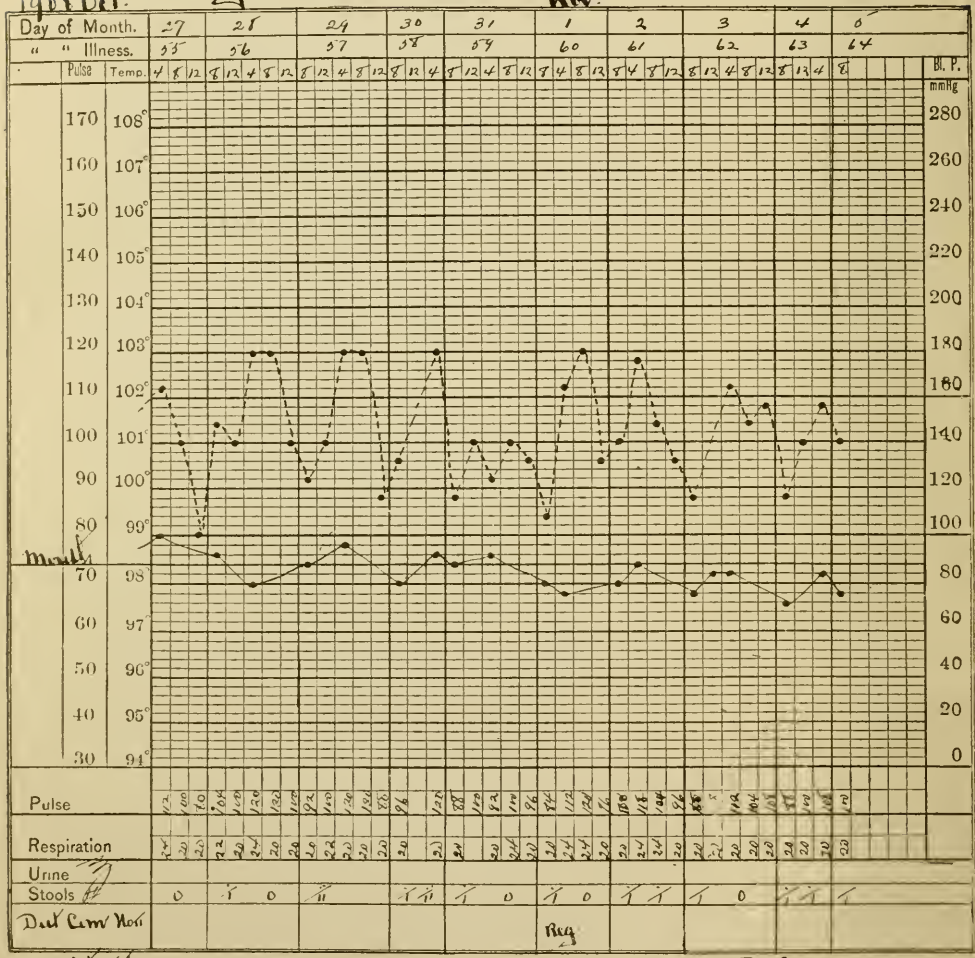
The temperature chart for a fortnight is worthy of reproduction.

ST. LUKE'S HOSPITAL.

Case No. 74976

Name Mr James D... Admitted 9-17-08 Ward Norris III

1908 Oct. Nov.



Weight 98

R.B.C. 4,900,000 Hl 95 cells appear normal

B.P. 90 123 mm Hg Systole

Hist. Form 5.

After several consultations with the attending physician, Dr. Norris, who feared that her heart would not bear general anæsthesia, I decided to try the bold procedure of this deep abdominal work under local use of the new anæsthetic, which Dr. Schley had used and studied abroad and at St. Luke's. He injected by hypodermic syringe a solution of novocaine, 4 per cent., adrenalin, 1-1,000, in the proportion of 4 parts novocaine, 1 part adrenalin. Of this a total of a hundred minims rendered the entire field of operation insensitive, so that, not only was the abdomen opened for six inches, but the gall bladder was split from end to end and two large gall stones removed from the common duct.

A hypodermic of morphine aided the efficient use of the local anæsthetic, and the patient left the operating room better than when she went in to be operated on, and had been conscious, with but little pain throughout the operation. No shock occurred or followed, and recurring chills and fever immediately left her. No abscess was found anywhere. A culture of the bile in the gall bladder showed only colon bacillus.

When she had made a complete convalescence, except that the bile still drained outwardly, it was found that when the outlet was plugged she again had fever.

Fortunately, the gall bladder had not been removed at operation, and at a second operation I again used novocaine locally, and operated painlessly, to unite the gall bladder to the transverse colon by Murphy's button, thus permanently discharging her bile into the intestine. She made an immediate recovery and remains well without fever.

2d.—A case of gall stone in the common bile duct, producing intermitting obstruction with pancreatic symptoms. Recovery after operation.

A woman of spare physiqué had had for a year constant recurring symptoms of acute epigastric pain, with simultaneous swelling exactly "in the pit of the stomach." There was no history of gall stone pain, with its characteristic pain in the shoulder blade, or gall bladder. The pains were rather those of acute indigestion, but associated with it was a faint jaundice of the eyes, sometimes clearing up entirely. The stools were normal and urine showed no bile. She had consulted three able physicians for indigestion, and was sent to me with the diagnosis already made of probable gall stone obstruction.

Before operation I was able to explain at the clinic that if a gall stone was in the common duct it must be that it lodged intermittently low down at the papilla, so as to cause a little bile to be dammed back into the pancreatic duct, which enters far enough above the papilla to permit the pancreatic and hepatic ducts to share the back flow.

At operation I removed just such a small, round stone, which could be chased back and forth in the common duct and descended lower down to the papilla than almost any I have ever seen.

This case illustrates most perfectly the relation of pancreatic disturbances to biliary regurgitation.

A RARE TUMOR OF THE LIVER.

A young man of thirty years, who came to this country from Roumania, observed a tumor at the pit of his stomach for four years past. It has grown slowly, is entirely within the abdomen and bulges the epigastrium in a rounded form.

It is entirely painless, and on examination shows a general smooth, round, hard surface, with two or more slightly rounder parts elevated above the rest.

The suspicion of ecchinococcus cysts was generally entertained, although the growth seemed to occupy the left lobe of the liver. Cancer, sarcoma, gummatous tumor, or the rarer adenoma seemed possible.

At operation the mass proved to be confined to the left lobe entirely. This was occupied by a group of rounded tumors of varying size, merging into each other, but all combined to replace the natural liver tissue and equal in bulk to more than the entire right lobe. The right half of the liver was smooth and in every way normal in appearance and feeling.

The color of the left side tumors was various and resembled in parts light colored liver and in others like liver changed to buff on its surfaces.

In parts the surface had grown adherent to the under side of the diaphragm.

Several thrusts of a large, hollow needle were made to test for fluid, but only such blood as would flow from liver tissue was obtained.

One characteristic tumor on the anterior edge was excised after being surrounded by a chain suture to check the great flow of blood that poured from any surface that was stripped or cut.

This was submitted to our Pathological Department, and Dr. F. C. Wood reports it as a primary adeno-carcinoma of the liver.

In gross appearance it resembled simple liver tissue lighter in color, as if undergoing fatty degeneration, though that did not appear under study.

The patient made an easy recovery from the operation and will be able to resume work as before.

ST. LUKE'S HOSPITAL.

Case No. 75742

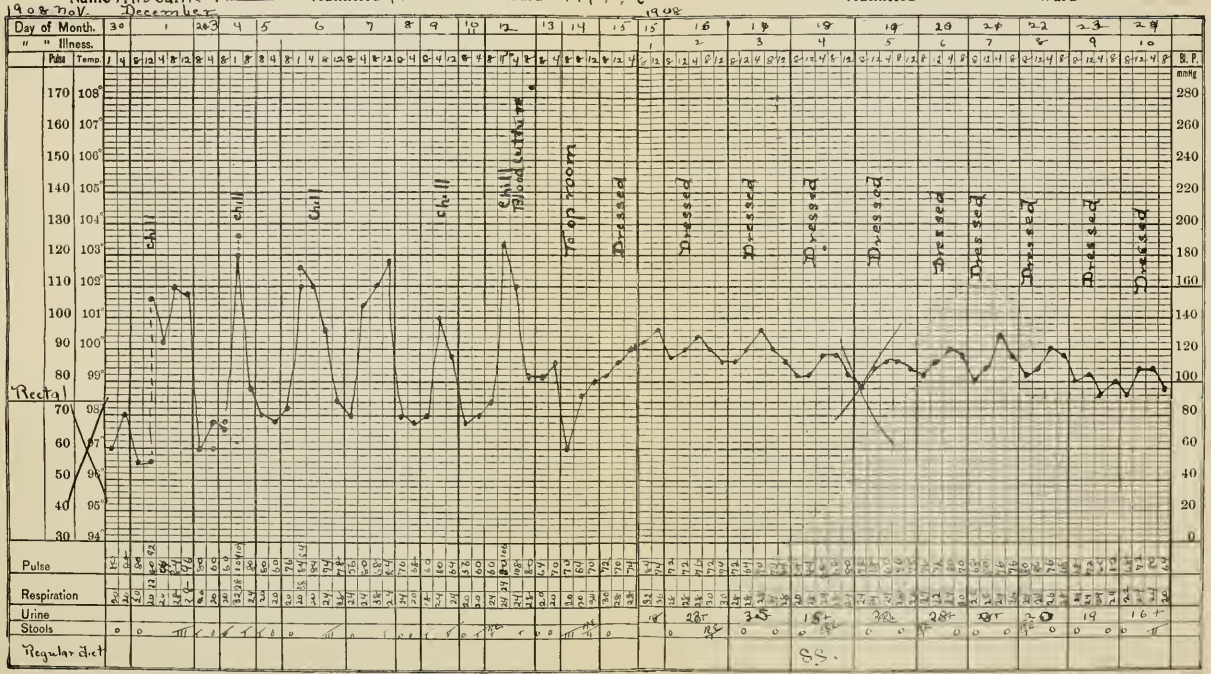
Name Mrs Carrie K. — Admitted 11-30-08 Ward MT, e

1908 Nov. December 1908

ST. LUKE'S HOSPITAL.

Case No.

Admitted Ward



Hist Fo

Hist Form 9

It represents one of the rarest forms of tumor, and it is difficult to explain why it should only have involved the left half of the liver.

This patient left the hospital with tumor unchanged and tried to resume work. After a month he returned to permit the use of Radium.

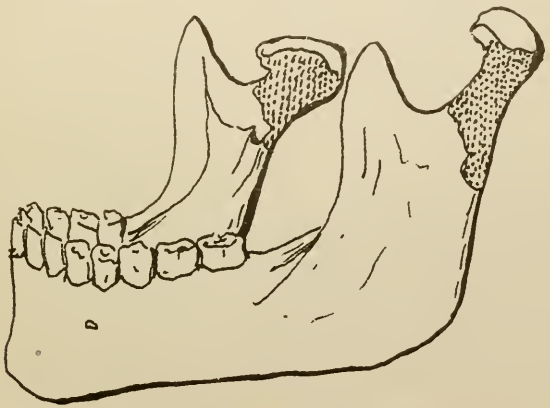
Small sterile glass tubes, containing a large quantity of the strongest Radium, were inserted into the center of the tumor at three points and left twelve hours, on two occasions.

After one month the tumor seemed to have shrunk and the man resumed work, to report later.

BONY ANCHYLOSIS OF BOTH SIDES OF THE JAW IN A YOUNG GIRL.

PERFECT RELIEF BY OPERATION.

A girl of thirteen years was sent to St. Luke's Hospital by her physician for absolute immobility of the jaws. She had had a grave pneumonia seven years before, with blood poisoning affecting several joints. Her life was then despaired of, but she ultimately recovered with one stiff hip joint and both sides of her jaw immovable. For seven years she had not been able to separate her teeth and lived on fluids sucked in at the sides.



NECK OF EACH CONDYLE REMOVED TO GIVE FREE JAW ACTION AFTER SEVEN YEARS' ABSOLUTE FIXATION.

From former experience with similar cases, one of which I had followed for seventeen years and found no loss of motion, I decided

on removing the neck of the jaw-bone just below the joint by a method which proved absolutely successful. An incision was made under the angle of the jaw, the scar of which was almost invisible and the masseter muscle stripped off the bone upward to the neck of the condyle. No injury was risked to the facial nerve by this method. The neck of the bone was gnawed away by small rongeurs and by bone curettes until enough was removed on each side to prevent bony union.

Then the jaw was gently pried open. For a few days only a half open mouth was secured, but each day afterward the long-stiffened parts yielded, and in one week she ate and chewed her food for the first time in seven years. In one month her jaw action was wide, quick, and painless, the full jaw opening being secured. Nearly a year has passed and the perfect result remains.

FREE, STRONG, QUICK JAW ACTION AFTER OPERATION. REMAINS PERFECT A YEAR AND A HALF AFTERWARD.

THE TREATMENT OF EMPYEMA WITH ASPIRATION DRAINAGE.

W. S. Schley, M.D.

The delayed healing of a number of empyema cases and the persisting sinuses that remain in a certain number for months or years sufficiently indicate that our methods of ordinary drainage, however faithfully they may be carried out, are inadequate for every case of pus in the pleural cavity. Where the purulent collection has been retained for some time or is deep and between the lobes, simple drainage is apt to fail; the lung thickly coated with inflammatory exudate and perhaps still affected, or expanding unequally, obliterates the cavity slowly and irregularly and the remoter areas healing more slowly frequently produce pocketing and retention of pus. Each year patients with persisting and discharging sinuses and contracted and misshapen chests present themselves in every hospital and clinic for relief. As the majority recover through simple drainage, we have, I think, regarded the usual procedure of opening the chest, with or without rib resection, as sufficiently successful and have disregarded the smaller number that drag on with their discharging sinuses and imperfectly functionating lungs.

A study of the healing cavity in the chest in empyema shows that it is closed in much more rapidly from side to side by lung expansion than from above downward, and it is in this factor that the danger of pocketing and retention by unequal expansion lies. In delayed sinus healing, the unequal lung expansion and more rapid progress of the skin and fascial planes may so shut off the tract as to interfere with proper drainage. With a lung, especially that has been compressed for some time by a purulent collection, the adhesions are so dense and the exudate so thick that some of them never expand again under simple drainage. There are also certain patients operated upon early, but in whom, nevertheless, even with a free exit for drainage, a sinus of considerable length tends to persist. Such lungs need, in addition to pressure from within, not only the removal of

pressure from without, but the establishment of a *decided negative pressure.*

This principle has not been generally utilized or taken advantage of, although the general principle of pus evacuation descends from ancient times. Thoracotomy dates from Hippocrates, but it was not until after 1600 A. D. that even the trochar and cannula came into use. Surgical drainage, in contradistinction to simple incision and evacuation, appears to have been first introduced by Chassaignac about 1859. Potain, in 1869, seems to be the first to have applied the siphon tube to evacuate cavities in empyema. The evacuation was made through a trochar and cannula opening. Playfair, in England, in 1872, introduced a siphon drainage by means of a long tube resting in a vessel of water, later arranged to permit of ambulatory treatment. This was one of the first continuous drainage appliances. Bulau, in 1876, introduced a similar method, an "aspiration procedure," and that for the first time was said to cure by lowering intra-pleural pressure. Tachard, in 1874, and Revilliod, in 1880, again and independently reported the use of permanent siphonage after pleurotomy. From the latter year the method become more popular in Europe, but was never generally adopted. From 1884 to 1889 Storch used the Bunsen aspirator, pus being drawn through a tube into an intermediary partly exhausted bottle. Much elaborate and complicated apparatus was evolved from this by followers in the succeeding years. In 1890, Phelps and Gilman Thompson, after animal experimentation, advocated valvular drainage after thoracotomy by valve flaps over the ends of the drainage tubes. This allowed expulsion of pus in expiration and coughing and created a slight degree of negative pressure on inspiration. O'Dwyer, about the same time, recommended this procedure after demonstrating the truth of the statement made by A. H. Smith in 1869 and Frentzel in 1876, that the "compressed lung by fits of coughing and other expiratory actions, with a more or less closed glottis, fills itself with air from the sound lung." If intra-pleural pressure can be removed the lung rapidly expands. Northrup and Chapin in the same year recommended the procedure in children. Williams, of Liverpool, as early as 1878, and Menzies Hutton, of London, in 1893, independently made such an apparatus. In 1898, Perthes introduced direct aspiration by means of Bunsen's hydraulic

THE PHOTOGRAPHS ILLUSTRATE THE SUCCESSIVE STEPS IN THE APPLICATION OF THE ASPIRATION DRAINAGE TO EMPYEMA CAVITIES AND SINUSES. W. S. S.

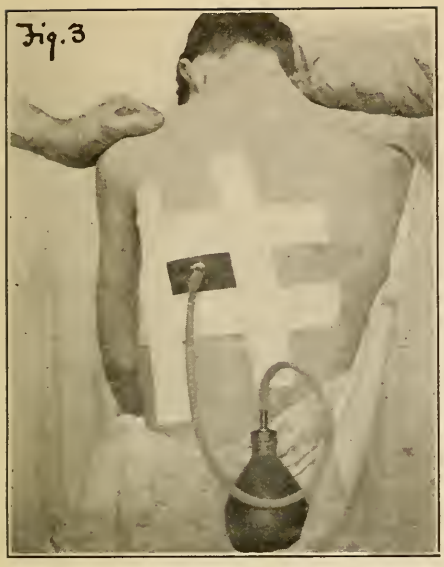


Fig. 3

Fig. 4

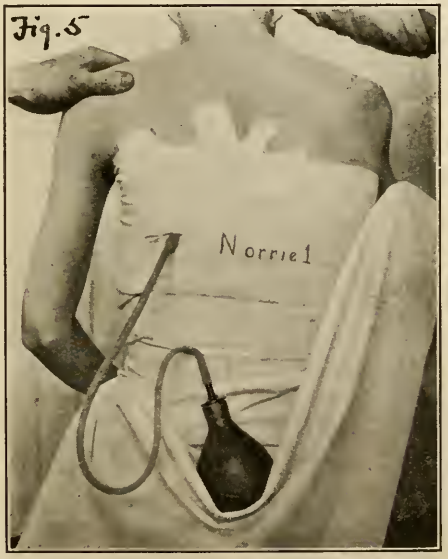


Fig. 5
Norriel

pump with a manometer attachment showing the degree of negative pressure. These procedures had none of them the advantages of ambulatory treatment, with the exception of the valvular method, which did not allow of perfect drainage, and confined the patient to his room or his bed. Bryant's advocacy of the resilient rubber bag of Politzer supplied the deficiency in this respect and permits the patient to be up and out of doors as soon as he is able to leave his bed and with the continuous benefit of aspiration drainage.

The amount of negative pressure required to overcome the elastic pull of the lung itself is small, having been estimated by Wintrich and Donders as one eightieth to one one-hundredth part of an atmosphere. A lung coated with exudate and adherent will stand a higher degree of vacuum but the constant effect of even so small an amount as that mentioned is of very apparent value. Too strong an aspiration at the start may cause a sense of thoracic constriction and cough and tinge the exudate with blood. In addition to the direct action of expansion upon the lung there appears to be a certain amount of Biers passive hyperæmia created for certainly dirty exudate is more rapidly thrown off, granulations stimulated, and purulent exudate changed to sero-purulent and serous than by any method employed up to the present time. While the method is of greater value in the older cases of empyema that have resisted simple drainage, and in the persisting cavities and sinuses, it has answered so well in all cases that it has been used as a routine procedure in the treatment of empyema upon the 1st Surgical Division.

The length of time that a lung may be compressed and yet expand is well shown in the case of a boy in the wards, in whom, after three years of pus in the chest with an imperfectly drained large cavity communicating with a bronchus, the lung was made to re-expand and fill its side of the thorax.

The method in acute cases has been to wait a day or two after the operation, usually done with rib resection, to allow the escape of the greater part of the purulent collection and then to substitute a single tube of 35 to 40 French caliber, inserting it 2½ to 3 inches within the pleura and packing about it in the wound iodoform gauze or a strip of absorbent cotton saturated with boric acid ointment. A piece of dentist's rubber dam, four inches square, is stretched over the tube and run down to the chest. This is overlapped by

strips of two-inch adhesive plaster. A circular pad of absorbent cotton is placed about the tube and a chest binder put on. A short glass connection, straight or elbowed, and a piece of smaller tubing joins the Politzer bag. A number of devices have been made of various materials to secure an air-tight joint at the chest wall, but I have found this scheme simple, inexpensive and more easily adapted to thin and angular chests and have known it to last as long as fourteen days without leakage. Patients soon become outdoor cases and the bags are easily held under the clothing and can be emptied as required by the patient and replaced. The apparatus and dressing should be changed every week where there is much discharge, and the lung expansion and vertical depth of the cavity or sinus noted. When the lung has expanded and comes in contact with the tube all about (and this was seen in seven days in an acute case) the tube is shortened, provided the vertical depth is shortened adequately or the tract very narrow at its upper part. In this way the tube is gradually removed, as the space is obliterated. It has been supposed by some that fibrin coagula would occlude the tube and check drainage, but, practically, this has not occurred, although fibrin strings have been noted well down the drainage tube without interfering with the flow of pus. It is essential to have the tube make an air-tight connection at the chest wall to stop leakage of air, which prevents the formation of a partial vacuum, and to prevent seepage of exudate, which separates the rubber dam and adhesive from the chest. The tube within the cavity or sinus is best fenestrated a short distance beyond its entrance to catch any material that does not enter the open end higher up.

A number of the earlier cases in which this treatment has been employed have been reported in detail elsewhere. Some of the typical ones of the last two years are of interest.

The most severe test of its value was in the case mentioned above, that of a boy 15 years of age, who, three years before entrance, had had an acute empyema following pneumonia. He was operated upon at home in the country with an intercostal incision. A year later, because of a persisting sinus, a portion of rib was removed to establish better drainage. On entrance, three years after the original trouble, he was emaciated and was running a septic temperature with the left chest contracted and flat, measuring 2½ inches smaller than

the right. There was a very small discharging sinus at the 9th rib anterior to the axillary line. A uterine sound enlarging the opening revealed a cavity of considerable size, and on passing the tip of the instrument upward and inward the heart beat was markedly felt and its motions communicated to the searcher. The apex beat was displaced to the edge of the sternum in the 5th inter-space. There was a foul, copious, purulent expectoration of the same character as the discharge from the sinus. It contained no tubercle bacilli. Methylen blue solution injected into the sinus was expectorated. The sinus opening was enlarged, evacuating much pus, and the overgrowth of bone from periosteum and rib removed. It was hoped that the establishment of free external drainage would allow the bronchial communication to close. The expectoration ceased five days after the operation, and at the end of two weeks a soft Politzer bag of slight aspiratory force was attached and found to remain collapsed. The boy gained strength and weight rapidly, and was soon able to leave his bed and be out of doors. Stronger aspiration with a higher degree of vacuum was used, and four weeks after the beginning of aspiration drainage he had gained twelve pounds in weight and the difference in the chest measurement was but 1½ inches. At the end of five weeks the sinus measured but four inches deep and admitted a 15 French catheter tube only. Aspiration was discontinued and a shorter simple tube inserted. He was healed eight weeks after the application of the Politzer bag, had gained 24 pounds in weight and was scarcely to be recognized as the patient of some weeks before. The total duration of aspiration drainage was five weeks. This boy was made to keep out of doors, take breathing exercises and blow against resistance, all of which no doubt materially aided in lung expansion.

A private patient, male, aged 42 years, had had pneumonia six weeks before entrance and was thin and septic on admission. He had retained an immense purulent collection in the chest for certainly three weeks, if not longer. A portion of the 8th rib below the angle of the scapula was removed under local anesthesia. The lung was greatly compressed and shrunken and the adhesions dense. Four days later aspiration drainage was begun. Eight days later the dressing was changed, and the cavity found but little more than half the size at operation. Four week after operation and on discharge

from the Hospital a sinus 4½ inches long and the size of the drainage tube (30 French) remained. Forty-seven days after the operation the wound was healed and the patient had gained 25 pounds in weight.

Two cases of simple empyema with early operation well illustrate the rapid closure that may be expected in such cases with aspiration drainage. The first, a man of 30 years, with empyema of the right chest following pneumonia, was transferred from the Medical Division and operated on at once. Resection of a portion of the 7th rib in the posterior axillary line revealed an empyema cavity of fair size. One week after the operation, only slight lung expansion having been noted, aspiration drainage was put on. Three days later there was a very appreciable expansion with an increased and thinner discharge. The ninth day after the aspiration the cavity had contracted to a size scarcely larger than the drainage tube and the walls were clean and granulating. On the eighteenth day the patient was discharged with a small probe sinus requiring external dressings only. Aspiration drainage was used but nine days. The second case, a man, aged 28, was admitted with empyema of the right chest following pneumonia four weeks before. At operation a cavity of moderate size was found. Two days later aspiration drainage was begun, and in seven days the chest cavity had contracted to a space 3½ inches vertically by about an inch laterally. Sixteen days after the start with the aspiration the cavity had contracted to the drainage tube. A short simple tube of 1½ inches was inserted for a few days. Twenty-three days after the operation and twenty-one days after the beginning of aspiration drainage the wound was healed.

In none of the simple cases has it been necessary to continue the aspiration longer than three weeks and in most a much shorter time. All of the cases treated thus far have proven successful, and the greatest duration of aspiration drainage has been five weeks (in the case mentioned above). The cases of empyema operated upon without undue delay recovered speedily. Those of longer duration before operation recovered more slowly, but still much faster and undoubtedly more surely than with simple drainage. Its routine employment in cases of empyema will make those extensive, risky and mutilating operations of Estlander, Schede and Delorme, done to obliterate the persistently suppurating tracts and cavities of some of these patients, exceedingly rare. The procedure is an entirely safe

one and obviates a more extensive and hazardous primary operation than thoracotomy with rib resection, which can be done under local anesthesia.

APPENDICITIS WITH PERITONITIS COMPLICATING PREGNANCY.

W. S. Schley, M.D.

A reference to the literature, usually a fairly reliable index, to hospital reports, and to communications from obstetricians of extensive private and hospital experience would indicate that an acute appendicitis with suppurative peritoneal involvement is, fortunately, an uncommon complication of pregnancy. Appendicitis in women appears to be no more frequently observed during the pregnant state than in those not pregnant, but when of an acutely septic type is one of the gravest complications of that condition.

As a part in the study of the surgical treatment of appendicitis as well as of the complicated processes of bacterial action and body immunity, a report in this case of acute appendicitis with diffuse septic peritonitis occurring in a patient 7 months pregnant, would seem of sufficient importance and interest.

M. F., aged 20 years, was admitted to the Hospital, upon the 1st Surgical Division, June 3d, 1908, with the diagnosis of acute appendicitis. She was taken four days before admission with severe pain in the central part of the abdomen, accompanied by nausea and vomiting. This was followed later in the day by a chill and fever. The pain gradually became localized "on the right side," but 48 hours later had spread over the whole abdomen. The abdomen was moderately distended, in addition to the uterine condition, was generally rigid and tender to touch all over. Her skin capillary circulation was poor and the pulse 124. The uterus measured a finger's breadth above the umbilicus and she was evidently in her eighth month of pregnancy. The diagnosis being clear, she was operated upon without delay and through the usual intermuscular incision over the appendical area. The appendix, free and gangrenous throughout its length, lay below and internal to the caput and in contact with the uterus, which had to be pushed to the left to see it. The peritonitis was of a diffuse type. The irrigation with saline was rather more difficult than usual because of the size

of the uterus, making it harder to reach the left side of the abdomen. She was drained with a small tube to the appendix stump. Her condition steadily improved, and she was out of bed with a normal temperature and able to take a few steps about the ward before her discharge to the maternity hospital, July 11th, when the wound had closed nearly to the skin. This patient was unable to take or receive nourishment from the time of her onset of severe pain, four days before entrance, until the second day after operation, and it seems remarkable that mother and child should have survived a rather prolonged deprivation in addition to the profound maternal toxemia. For several weeks, and until the peritoneum had closed off by the process of healing, the uterus could be seen in the wound and the drainage tube was in contact with its wall. She was delivered of a normal healthy child July 11th, but in a few days the temperature rose and a pyæmic condition developed, to which she succumbed on the 17th day after confinement. Autopsy showed multiple superficial abscesses, with a number of small accumulations among the intestinal coils. The uterine wall, cavity and sinuses presented no gross evidences of infection.

While appendicitis complicating pregnancy is relatively infrequent, its occurrence is greater than reports would indicate, as it is only the severer cases that have been recorded and discussed as a rule. Babler last year collected but 207 cases, and I have been able to add but 8 unpublished ones, making a total of 215. These were nearly all of the severe variety, 109 being perforative or gangrenous cases with localized or diffuse peritonitis and 106 acute, but not perforative or gangrenous. Of the 109 badly septic cases, 55 died, 41 after operation and all of those treated medically. Of the 106 less severe cases, 5 died, 1 after operation and 4 among those not operated upon. Of the 95 operated cases of gangrenous and perforated appendix (in the series of 109), 75 miscarried, 42 after operation. In the 52 operated cases (of the 106) without peritonitis, 15 miscarried, 9 after operation.

From the fourth month of pregnancy on more than half the cases with peritoneal involvement showed the spreading or diffuse form of peritonitis, and of these over 82 per cent. died. This high mortality is chiefly to be attributed to delay in operation, but also to the more delicate balance of later pregnancy. Further, the uterus filling and rising out of the pelvic basin prevents a gravitation of exudate to that region and tends to displace the caput and appendix to a higher level and to a region where dissemination of exudates

more quickly becomes generalized. In the operated cases but a little over half the miscarriages that occurred followed the operation, showing that the surgical work had but a slight adjuvant influence in emptying the uterus. These are the results of operation in the hands of many operators. Present day methods of earlier interference and quicker work with the minimum of trauma and disturbance have and will continue to show constantly bettering results. While it is not every case of appendicitis during pregnancy that requires operation, the presence of that condition is not to be considered a bar to surgery, should not render the diagnosis more difficult or delay the operative treatment when indications point to its wisdom in properly acute conditions. The mortality to both mother and child in acute appendicitis complicating pregnancy is chiefly that of delay rather than that of mistaken diagnosis. The mortality to both mother and child in the non-operated cases with peritonitis was 100 per cent.

At the different periods of pregnancy and with differing intra-abdominal conditions, as well as with the condition of the mother, the surgical methods may vary, but it is undoubtedly wiser, under almost every circumstance, to operate first and attempt the relief of severely acute conditions in the effort to reduce the maternal danger. It has been recommended with a localized abscess occurring after the fourth month, to operate first and not attempt to disturb the uterus until later, as the latter usually forms a part of the abscess wall after that time. Also, in the presence of a spreading or diffuse peritonitis, to operate without disturbing the gestation in the earlier months, but towards the end of pregnancy do accouchement forcé first and follow it with operation. Cesarean section has also been proposed in place of the last procedure and where the child is alive, but seems unwise, because of the practical impossibility of keeping the peritoneal infection out of the uterine interior and sinuses, which are far less able to deal with it than the peritoneum or circulating blood. No rule can be established and the conditions at the time, and of the mother especially, must be the guide. In the case of the patient here recorded, her condition on entrance and for some days thereafter was so serious as to contraindicate more than the surgical work for the appendicitis and peritonitis, by quick operation with small incision, irrigation and drainage in

reclining rather than full Fowler position. Spontaneous delivery at no time showed any decided tendency to occur, but the attempt was made to prevent it for the first few days by adding an occasional dose of laudanum to the slightly warm rectal salines. Her condition continued to improve with no reactions, and all efforts were directed towards preparing her for the further ordeal of parturition near at hand. The death of this patient 17 days after her *confinement*, and 55 days after her operation, with the conditions at that time and the findings at autopsy offer interesting problems. The liquor amnii at birth was undoubtedly infected with colon bacilli, and it is regrettable that no cultures were obtained to determine the presence of streptococci or other pus cocci. The placenta and membranes appeared normal. There was, no doubt, from an early period in her illness a degree of bacteriemia, probably with a predominance of colon organisms in the latter half. It is most likely that the liquor amnii became infected through the blood, but possible also through the tubes, through the lymphatics of the so-called appendiculo-ovarian ligament and by direct penetration. The infant was not involved, was healthy at birth and remained so. Blood reactions with the placental blood would have been valuable. The temporarily acquired or balanced immunity of the mother was disturbed by the changes at and after birth with renewed bacterial activity and the resulting pyæmia.

LOCAL ANESTHESIA IN MAJOR SURGERY.

W. S. Schley, M.D.

The constant effort on the part of clinicians and chemists to find substitutes for ether and chloroform has not resulted in extensive or rapid progress since the discovery of the anesthetic properties of these agents over sixty years ago, although much advance has been made in safer and more agreeable administration.

For the average case, and especially in experienced hands, they are very safe anesthetics, but their employment even then is marked by more or less disturbance that shows they are a foreign substance

to the body, a toxic agent, and that we are purchasing anesthesia at a price. In the average case the price is not too high, even though it be disagreeable, but in those desperate conditions with a profound bacterial toxemia, and especially in those suffering from grave disturbances of their own metabolism, it has always been a serious consideration. Surgery has offset much of this by more rapid operative work and simplification of technique, but there has always remained a certain number of cases that, despite our best efforts, occasionally succumb to the additional insult of a general anesthetic. Such added risks are the diabetics, nephritics, those with marked disturbances of the thyroid gland, liver (and, I believe, pancreas as well), and those with a greater or less degree of organic disease of other regions, and in whom an intercurrent affection demands the intervention of surgery. For a number of these, to save added hazard, and for some of those condemned to bear burdens for the space of their existence because they are poor operative risks, local anesthesia is applicable and distinctly able to offer relief, and to a greater extent every year, as our methods are perfected and anesthetic agents of lesser toxicity or greater adaptability found. It should not be understood that local methods are proposed as a substitute for general narcosis, the latter is our chief reliance, and will probably so remain for some years, but the place of local anesthesia in the larger surgery has come to stay and its field has steadily widened until it has successfully entered the domain of major surgery. While still at its greatest usefulness, where general anesthetics add distinctly to the danger, it has arrived at that stage in its development where it can, in addition, be extended to numbers of cases to enable them to escape the disturbances and discomforts of ether and chloroform and to insure a quicker and pleasanter convalescence.

The opportunity for the employment of local anesthesia has not been utilized by many, and the majority of operators do not seem to have had the inclination, the time or the patience to acquire this method in suitable cases or where the general anesthetics were greatly added risks or were prohibitive. In the hands of a comparatively small number during the last few years, however, there has been a marked advance in its development, so that it is now possible and permissible to operate with its aid in conditions that

a short time ago were regarded as unapproachable except with complete and general narcosis. In minor surgery it has long been an adjunct and one usually utilized, but in major work, with the larger number, and physician and layman alike, there is still much scepticism and disbelief with regard to the possibility of operating painlessly and successfully with local anesthesia and it is more often regarded as an impossible accomplishment. It must offer something more than relief from pain and must be appreciated as a distinct advantage in many cases if not as a life saving procedure as well. The lack of a wider use is probably due to the fact that newer methods are accepted slowly, and often properly so, to the fact that the earlier use of too strong cocaine solutions frequently gave toxic symptoms and were not used with the skill as at present, that improper cases and occasions were sometimes selected for its use and because general anesthesia is easier for the surgeon.

From a usage in minor surgery and a tentative use in major surgery in properly selected cases, its application has slowly extended as its advantages have been better understood.

The conspicuous advantages of local anesthesia are the greatly reduced or total absence of shock, absence of respiratory and gastric disturbances, and the apparent absence of any other organic disturbance with a more agreeable and safer postoperative period. Even in abdominal work and with the exposure and handling of viscera and cutting operations, unless continued at great length and with unnecessarily rough handling and cooling of the parts, there will be no evidence of shock then or later. These patients are entirely conscious and able to converse and reply to questions throughout the operation and it is frequently remarkable to see them the following day looking better than before and giving no evidence of the operative work. They frequently leave the table with a lower pulse rate than when they go on.

The absence of shock I believe due to the more or less complete nerve block, absence of abnormal heat radiation from the surface and lungs and absence of the direct toxic action of the anesthetic upon the nerve tissue of the brain and spinal cord. The nerve block and the enforced rather gentler manipulations save the spinal cord from a bombardment of impulses while laboring under the effect of a toxic agent, and there is little or no fall in vaso-motor tone, that first indicative

of shock. The addition of adrenalin to the anesthetizing solution further acts to diminish the speed of absorption of the anesthetic and to maintain vaso-motor tone.

Rapidity and gentleness of manipulation in operating have been the greatest factors contributing to successful results under general narcosis and local anesthesia is in no wise a substitute for the latter, as successful work by this method requires an even lighter degree of touch.

While we speak of the method of local anesthesia in a literal sense as applying to the direct anesthetization of the tissues to be operated upon, it seems in order to mention here that development of local anesthesia, regional anesthesia, accomplished by spinal anesthetization, by injections of the larger nerve trunks or by injecting the vessels of the part with the anesthetizing solution. The introduction of spinal anesthesia was a great advance over the methods of local anesthesia in use at that time, but undoubtedly as originally practised led to several mortalities. It has a distinct usefulness in operations upon the lower extremities and more so recently with the advent of novocain, the latest substitute for cocaine, and with which we find very little or no constitutional disturbance in proper dosage. The introduction of a drug into the spinal fluid usually produces some general reaction if the anesthesia extends much above Poupart's ligament, but careful spinal anesthesia must rank between general narcosis and a purely local anesthesia. The intra-neural method of Crile and Matas, by nerve blocking, has received too little attention and has a field of usefulness in amputations and in the larger operations upon the extremities. The venous method of Bier has a lengthy technique, employs a toxic amount of anesthetic solution, which has to be washed from the vessels after the operation and seems to have little to recommend it over the intra-neural American method of nerve blocking.

The particular method of local anesthesia that I wish to speak of here is neither the infiltration method of Schleich nor the neural method of Crile, Matas or Cushing, but one of purely local anesthesia of the subcutaneous tissues and cellular planes with limited amounts of the solution of the anesthetic, a method that has, I think, accomplished as much as any one other proposed. It is one that is

especially adapted to abdominal work as well, and in this field has undoubtedly a brilliant future.

In doing hernia operations and colostomy by this method, with the necessary handling of the gut and peritoneum, and with undoubted painlessness, it became more and more apparent that the abdominal viscera, with their peritoneal investment and the general space of the peritoneum, could be explored and operations done as well as in these cases, provided there was not a coexistent acute inflammation. It was further apparent in bad cases of strangulated hernia that the gut could be divided and reunited with absolute freedom from pain. The immediate subsidence of vomiting and the excellent condition of these patients after operation was most striking. The knowledge and experience gained in these operations has been utilized during the past year in extending the method to a number of suitable abdominal and other cases, in some of which the method has been put to as severe a test as might well be expected of a more general anesthetic yet has been adequate and yielded uniformly good results. In preparing patients for major operative work under local anesthesia they have frequently, but not invariably, been given one-fourth of a grain of morphine by hypodermic an hour before the operation for quieting effect. The anesthetic agent has been the novocain-adrenalin mixture as recorded in former reports of work. I had verified after experimentation the claim that the toxicity of novocain was but 1/6 that of cocaine, and, furthermore, that when combined with adrenalin it had anesthetic properties and a suitability much above cocaine or its combinations when injected hypodermically. It was also found in the same work that the combination is even less toxic than the novocain solution alone. It has been used in 2 or 4 per cent. solution with adrenalin (1-1000) added and in the proportion of 5 or 6 to 1. The maximum amount that has been employed was 140 min. of the combination of 4 per cent. novocain with adrenalin in probably the most extensive laparotomy that has been done under local anesthesia, a case of ovarian cystoma done outside the Hospital in which I had the opportunity of operating and in which the generally adherent tumor weighed over 50 pounds. It was necessary to make a 12-inch incision through the abdominal wall to turn out the immense semi-solid tumor, separating and frequently ligating the adhesions to

the intestine and finally the broad pedicle. This operation was done in the presence of a beginning pulmonary tubercular lesion and a general anesthesia was unwise. This patient was conscious throughout the procedure and I conversed with her frequently while operating. She took nourishment the evening of the operation and slept some six hours that night, showing no shock at any time.

The great advantage of this mixture, in the stronger percentages, over the more dilute infiltrating solutions of cocaine or other drugs is the remarkable diffusive action which does its own infiltrating, and the longer we wait the better the anesthesia. It will frequently be found of wider extent at the end of the operation than at the beginning. We have the further advantage of operating through tissues that are dry and comparatively bloodless and in which the larger vessels stand out in contrast with the paler surroundings. We have also a more durable action. Secondary hemorrhage of any degree whatsoever or interference with wound healing has never been observed. Novocain, in contrast to cocaine, has no action on the peripheral blood vessels.

In some of the earlier cases the patients were given a small amount of alcohol or ether by inhalation to distract their attention from the operative work, but recently, through greater experience and familiarity with the method, it has been possible to rely on the anesthesia and reassurance alone and the preliminary morphine dose has also often been omitted.

During the last two years much of this work has been done upon the 1st Surgical Division and the year past to an increased extent in abdominal cases with most gratifying results. No operations requiring extensive dissections have been done so far except in goiter (struma and exophthalmic, and to which it is particularly suitable) and operations for malignant disease and such conditions have been done under general narcosis. Abdominal exploratory measures for suspected tumors, obstructions and perforations may be especially well accomplished in those serious conditions in which it is so often called for, and there is nothing in this method of local anesthesia to contraindicate general anesthesia at any time it may be found wise or necessary and the amount required will be much less than normally.

In addition to inguinal and femoral hernia operations, major

and minor amputations, thoracotomy with rib resection, ligation of arteries, operations for goiter, plastic face operations of considerable extent, removal of single and multiple cervical, axillary and inguinal glands and a number of other procedures for which ether is usually given as a routine, there have been done 14 laparotomies in cases with acute affections or chronic organic ailments in which it was unwise to attempt general narcosis. Such cases have been, opening the abdomen for tubercular peritonitis, traumatic rupture of the jejunum, acute intestinal obstruction from impacted enteroliths, acute pancreatitis (exploratory laparotomy), for stones in the gall bladder and common duct, for gall bladder intestinal anastomosis, for exploratory laparotomy and cystotomy, the interval operation for appendicitis and for appendical abscess. In abdominal work we are able to take advantage of the insensitiveness of the peritoneum and viscera, and, except with a large deposit of fat in the subcutaneous tissues of the abdominal wall, the procedure is not difficult.

In tubercular peritonitis with effusion the method is of great advantage and is especially indicated in the presence of pulmonary lesions and bad general condition. The first case so operated upon was in exceedingly poor shape, and with pulmonary involvement his recovery would have been doubtful under general anesthesia. He has gained over 40 pounds in weight, and a year after his operation is apparently well. The cases of intestinal obstruction from impacted stones in the jejunum and ileum occurred in patients aged 74 and 60 respectively, who were in critical condition on the fourth and fifth days of their obstruction on entrance and when operation was done. The cessation of vomiting after operation was immediate, their condition improved at once and neither showed any evidence of the operative work the following day. The patient operated upon for stones in the gall bladder and common duct had also a cardiac complication and was in bad condition and toxic from bacterial invasion and deranged liver. The operation was in every way successful and the stones were removed from the gall bladder and common duct, which was opened nearly its entire length. A cholecystenterostomy was later done by the same method and the gall bladder anastomosed with the large intestine without difficulty.

Among the amputations of considerable interest was that of a

patient afflicted with diabetes of long standing, in whom it was necessary to remove the leg above the knee. This patient had lost the other leg well above the knee for similar trouble two years before, and upon that occasion had taken ether. Fifteen drops of a plain 4 per cent. novocain solution were injected into the subdural space between the first and second lumbar vertebrae after allowing the escape of a similar amount of cerebro-spinal fluid. In twelve minutes there was complete anesthesia of the leg to the groin and operation was begun. This patient called for something to read and commented from time to time upon what he heard and imagined was going on. He showed only slight headache with loss of appetite for a day or two and made an uninterrupted recovery. We have amputated both legs and arms under laughing gas and most successfully, with complete return of consciousness without pain after a few inhalations of air, but the complete and undisturbed consciousness of this patient throughout the operation was of unusual interest.

All of the patients operated upon under local anesthesia have recovered, and their condition and convalescence, I am sure, has been much more agreeable, if not safer, than it would have been with a general anesthetic. The local anesthetic was injected but once at each operation and at the beginning, and it has never been necessary to use an additional amount later. There are many other procedures that may be successfully carried out in appropriate cases, and in those able, as well as in those unable, to take a general anesthetic, but character of the disease, character of the patient and the surroundings are the factors that must determine the choice of the anesthetic agent. While local anesthesia is not submitted as a substitute for general anesthesia, it has a definite and widening field of usefulness that may be increased with experience and the use of modern methods. While the danger from general narcosis in experienced hands is at its minimum, that from local anesthesia under similar conditions and where it can be utilized is always less.

REPORT OF FOUR UNUSUAL CASES OF HERNIA.

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So much has been written about hernia as to operations, varieties, results, statistics, etc., that there seems little left to be said, and while complications, such as strangulation, hydrocele of the tunica vaginalis or of the cord, undescended testes and varicocele, are of frequent occurrence in the cases met with in the service of St. Luke's Hospital, the report of the following four cases operated upon by the writer and occurring in Division B on the service of Dr. B. F. Curtis and Dr. C. L. Gibson, to whom I am indebted for permission to publish these reports, seem worth reporting because of several unusual features.

The first two cases were inguinal hernia of the tube and ovary:—

CASE I.—A. L.—Age, five months; had a mass in the right inguinal region since she was three weeks old. It disappeared several times; was present for two days before admission to the hospital, when it appeared tender and painful. During this time the baby did not move, apparently because of pain in the tumor, and she vomited frequently. She has always been constipated.

Physical Examination.—In the right inguinal region is a swelling the size of a walnut, firm, tender, irreducible, no impulse on crying and flat on percussion. Skin over mass movable, not red or inflamed. Abdomen soft; no sign of peritoneal inflammation.

As the baby's bowels did not move, and the mass was irreducible, and no impulse was present a diagnosis of strangulated inguinal hernia was made and an immediate operation was performed.

The ordinary incision for inguinal hernia revealed a very much enlarged ovary, which, with the tube, was twisted on the broad ligament as a pedicle and was black and strangulated. As the vitality of the tube and ovary were lost they were excised. The usual Bassini operation for inguinal hernia was performed. Healing was by primary union, and the patient was discharged cured.

CASE II.—D. F.—Age, 44, married, housewife, born in the United States. *Family History.*—Both parents and oldest son ruptured; previous history, negative.

Present Illness.—For five months patient noticed after any exertion, especially sweeping or lifting, that a small lump about the size of a hazel nut would appear in the left groin; very painful and tender. Patient was always able to reduce it part way. Lying down would help reduction and relieve pain. Last time swelling appeared it was almost as large as an egg, and was accompanied by severe pain which radiated up the groin. Patient said pain seemed as though it was in the ovary. Pressure on lump caused pain in stomach and nausea and made patient feel faint. Lump did not appear regularly; the last time was three days ago.

Physical examination showed an enlarged inguinal ring, but, although patient was in the ward for four days, the hernia did not come down.

The usual Bassini operation for radical cure was performed, a moderate sized sac found, which was empty, but on opening the sac on inserting the finger into the peritoneal cavity, the tube and ovary could be felt just internal to the abdominal ring, and had evidently formed the contents of the hernia. Healing was by primary union and convalescence uneventful.

These two cases are reported not with the idea of suggesting anything new as to diagnosis or treatment, but on account of their comparative rarity. Andrews, in the "Journal of the American Medical Association," November 24th, 1906, reported ninety-nine cases of hernia of the tube and ovary, eighty-eight being inguinal; five, femoral; four, obturator, and two ischiatic. Carstens ("Journal of the American Medical Association," November 2nd, 1907) collected one hundred and seventeen cases; and Boldt ("Surgery, Gynecology and Obstetrics," March, 1908) and Kivlin ("New York Medical Journal," August 29th, 1908), have each added one case since then.

While this would appear to be quite a rare condition when men of such experience as Kelly ("Operative Gynecology," Vol. 2, p. 599) reports seeing only two cases, both of which were associated with congenital deformities, probably the best idea of its relative frequency can be obtained from the statistics of Bull and Coley ("Journal of the American Medical Association," September 21, 1907), in their report of two thousand operations for hernia, four hundred and thirty operations being on females (three hundred and seventy-four for inguinal, fifty-six for femoral hernia) found the sac to contain the tube and ovary in five cases, the tube alone in one and the ovary alone in two.

The third case was one of tuberculosis of the hernial sac.

Case III.—M. D.—Age, 26, colored, born in the United States, domestic. Family history and previous history negative. *Present Illness.*—No previous history of ill-health, but patient entered hospital on account of small lump in left inguinal region, which had appeared two months previously.

Physical examination of the chest, abdomen and by vagina were negative. There was a small inguinal hernia on the left side, and the external abdominal ring on the right side was found enlarged.

At the time of operation, when the sac on the left side was dissected out, it was found that it was very much thickened. On opening the sac the peritoneal surface was found studded with miliary tubercles, and digital examination made by passing the finger into the peritoneal cavity through the internal ring showed the peritoneum and intestines to be studded with small tubercles as far as could be felt, while a tuberculous infiltration of the broad ligament and left Fallopian tube could also be palpated. The usual Bassini operation was performed on the left side, and the ring closed on the right side without opening the peritoneum. The patient had a chill, with a temperature of 104° F., pulse, 120, and respiration, 36, the day following the operation, and both wounds became infected. The skin sutures were removed and the wounds rapidly cleaned up, and she was discharged with the wounds entirely healed on the twenty-ninth day.

It has been impossible to trace this patient and find out the subsequent course of the tuberculosis lesion, but the case is reported as tuberculosis of the hernial sac, which, in the absence of symptoms of tuberculous peritonitis or of physical signs elsewhere, is quite rare, Bull and Coley in their two thousand operations reporting only three cases of tuberculosis of the hernial sac.

The fourth case was of interest, not on account of the contents or condition of the sac, but because of the difficulty of diagnosis caused by the complication of an acute gangrenous appendicitis and general peritonitis.

Case IV.—P. H.—Age, 56; German; butcher; family history negative.

Previous History.—Had right inguinal hernia for ten years, always reducible; never wore truss. *Present Illness.*—The night before admission to the hospital patient had severe pain in the right side of the abdomen, low down near the iliac fossa. Took two doses of salts, with no result; sent for a doctor, who tried to reduce the hernia, but was unable to do so; administered an ounce of ol. Ricini without result; no fever or vomiting, the pain being the only symptom complained of by patient.

On admission patient had temperature of 103° F., pulse, 122, respiration, 28; leucocytes were 19,700, with a polynuclear percentage of 87.

Physical examination showed a patient who looked sick; heart and lungs were negative, but the respiration was shallow and thoracic. The abdomen was distended, tense, and tympanitic, rigidity general, but most marked on the right side; liver dullness diminished; no mass or free fluid determined. There was a bubonocele present in the right inguinal region, very tense and extremely tender, slight impulse on coughing, but irreducible.

An immediate operation was advised and an incision made over the mass. The sac contained a small knuckle of intestine, which was constricted, but not strangulated, by the spasm of the abdominal muscles, and which returned when these muscles were relaxed by complete narcosis. The sac also contained a considerable quantity of pus coming down from the general peritoneal cavity, where there was a general suppurative peritonitis due to a gangrenous appendix. By slightly inlarging the incision the appendix was easily removed, the abdominal cavity irrigated with a Blake tube, a procedure rarely employed by the writer in general peritonitis, but done in this case because, on account of the position of the incision, sponging could not be thoroughly accomplished. The wound was drained by a large rubber tube. Culture showed colon bacillus and streptococcus.

The day following operation the temperature had fallen to 99° F., pulse, 92, and respiration, 24, but the temperature started to rise again, and on the fourth day was 102° F., with a pulse of 112. Vomiting and distension continued, and as it was evident that a mechanical obstruction, probably from adhesions, was present a second operation was performed. A median incision five inches long was made above the pubes and the obstruction found to be due to adhesions, causing a kink in the ilium a short distance from the cæcum. This obstruction was relieved and gas was felt to pass into the large intestine. There were many other adhesions, however, but it was interesting to note that the pus had entirely disappeared from the peritoneal cavity. Notwithstanding the use of atropine, physostigmin salicylate, stupes, gastric lavage and enemas, the distension and vomiting continued, and the following day the upper angle of the wound was opened, a portion of the distended intestine sutured into the wound and an enterostomy performed. The patient continued to do badly and died four days later, nine days after the original operation.

This case has been reported because of its interest as a matter of diagnosis, as the presence of rigidity of the abdominal muscles due to the general peritonitis caused the hernia to become irreducible and gave some of the symptoms of strangulation, although the high

temperature and blood count, as well as the general abdominal tenderness and rigidity, appearing within twenty-four hours of the onset of the attack, seemed to indicate before operation the presence of a general peritonitis, probably due to a gangrenous appendix. While a number of cases of acute inflammation of the appendix contained in a hernial sac have been reported, and one case seen by the writer, the combination of conditions presented by this patient must be exceedingly uncommon.

145 West 81st St.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
GENERAL DISEASES.									
Typhoid fever	38	36	1	...	..	[1]1	4	..	80
Typhoid fever with hemorrhage	3	4	...	...	..	..	...	..	7
Typhoid fever with relapse, hemorrhage, periostitis and laryngeal stenosis	....	...	...	...	..	..	1	..	1
Typhoid fever with perforation	....	...	...	...	..	[1]1	...	..	1
Typhoid fever with perforation and hemorrhage	....	...	...	...	..	..	...	1	1
Typhoid fever with lobar pneumonia	1	1	...	...	..	..	...	..	2
Typhoid fever with broncho-pneumonia	3	...	...	...	..	..	...	1	4
Typhoid fever with pneumonia, pleurisy with effusion, and phlebitis	1	...	...	...	..	..	...	..	1
Typhoid fever with pneumonia and local peritonitis	....	...	...	...	..	..	...	1	1
Typhoid fever with tubercular pneumonia and chronic pulmonary tuberculosis	....	...	...	...	..	..	...	1	1
Typhoid fever with pernicious vomiting	....	...	...	...	..	..	1	..	1
Total typhoid fever									100
Cerebro-spinal meningitis	1	...	...	...	..	..	1	1	3
Tubercular meningitis	....	...	...	...	..	..	1	3	4
Tubercular meningitis, tubercular bronchitis, tubercular kidney	....	...	...	...	..	..	...	1	1
Malaria	10	6	1	...	..	..	...	..	17
Double tertian malaria	....	1	...	...	..	..	...	..	1
Æstivo-autumnal malaria	1	...	...	...	..	..	...	..	1
Malaria, incipient pulmonary tuberculosis	....	...	1	...	..	..	...	..	1
Tetanus	....	...	...	...	..	..	...	1	1
Diphtheria	1	...	...	...	..	..	...	..	1
Vaccinia	1	...	...	...	..	..	...	..	1
Measles	....	1	...	...	..	..	...	..	1
Chorea	....	1	...	...	..	..	...	..	1
Huntington's chorea	....	...	1	...	..	..	...	..	1
Secondary syphilis	....	...	1	1	..	..	...	..	2
Tertiary syphilis	....	...	...	...	..	1	...	..	1
Cerebral syphilis, syphilis of the spinal cord	....	1	1	1	..	..	...	..	3
Cerebral syphilis	....	...	...	...	..	..	...	1	1

1 Transferred to Surgical Division.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
GENERAL DISEASES.—Concluded.									
Cerebral syphilis, multiple neuritis, facial neuralgia, conjunctivitis	....	...	...	1	..	..	...	..	1
Syphilitic cirrhosis of the liver	....	...	...	...	..	..	1	..	1
Gumma of the liver	....	...	1	1	..	..	...	..	2
Specific osteitis	....	...	...	1	..	..	...	..	1
Total syphilis									12
Influenza	13	27	1	1	..	..	...	..	42
Influenza, otitis media	1	...	...	...	..	..	...	..	1
Influenza, otitis media, mastoiditis	....	1	...	...	..	..	...	..	1
Influenza, otitis media, melancholia	....	...	...	...	..	1	...	..	1
Influenza, frontal sinusitis	....	1	...	...	..	..	...	..	1
Influenza, myalgia	....	1	...	...	..	..	...	..	1
Influenza, chronic pleurisy	1	...	...	...	..	..	...	..	1
Influenza, dry pleurisy	....	1	...	...	..	..	...	..	1
Total influenza									49
Septicæmia, (pneumococcus)	....	...	1	...	..	..	...	..	1
Septicæmia, erythema multiforme	....	1	...	...	..	..	...	..	1
Septicæmia, septic endometritis, septic pneumonia	....	...	...	...	..	..	...	1	1
Auto intoxication	2	3	...	...	..	..	...	..	5
Fever	1	1	...	...	..	..	...	..	2
Intestinal toxæmia	2	1	...	...	..	..	...	..	3
DISEASES OF THE RESPIRATORY SYSTEM.									
Asthma	....	1	...	1	..	..	...	..	2
Asthma, chronic endocarditis	....	...	1	...	..	..	...	..	1
Asthma, emphysema	....	...	1	...	..	..	...	..	1
Total asthma									4
Bronchitis	2	...	...	2	..	..	...	..	4
Acute bronchitis	4	3	...	...	..	..	...	..	7
Acute bronchitis, otitis media	....	...	1	...	..	..	...	..	1

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE RESPIRATORY SYSTEM.—Continued.									
Chronic bronchitis	....	...	2	4	..	..	...	..	6
Chronic bronchitis, asthma	....	...	3	3	..	..	...	..	6
Chronic bronchitis, emphysema	....	...	7	3	..	..	...	..	10
Total bronchitis									34
Emphysema	....	...	1	...	..	..	...	..	1
Pneumonia, acute appendicitis	....	...	...	[1]1	..	..	...	..	1
Lobar pneumonia	21	7	[2]1	1	..	..	15	5	50
Lobar pneumonia, delirium tremens	....	1	...	...	..	..	...	..	1
Lobar pneumonia, pleurisy with effusion	....	1	...	...	..	..	...	..	1
Lobar pneumonia, empyema	1	[3]1	...	...	1	..	...	..	3
Lobar pneumonia, gangrene of lung	....	...	...	...	..	..	1	..	1
Lobar pneumonia, asthma, emphysema	....	...	1	...	..	..	...	..	1
Lobar pneumonia, pericarditis with effusion	....	2	...	...	..	..	...	..	2
Lobar pneumonia, carcinoma of the œsophagus	....	...	...	...	..	..	1	..	1
Lobar pneumonia, cystitis, neurasthenia	1	...	...	...	..	..	...	..	1
Lobar pneumonia, hemiplegia	....	...	...	...	..	..	...	1	1
Lobar pneumonia, convalescing	2	...	...	...	..	..	...	..	2
Lobar pneumonia (resolving), catarrhal jaundice	1	...	...	...	..	..	...	..	1
Total lobar pneumonia									66
Grippe pneumonia	1	...	...	...	..	..	...	..	1
Grippe pneumonia, chronic bronchitis	....	...	1	...	..	..	...	..	1
Broncho-pneumonia, septic arthritis of knee	....	...	...	[1]1	..	..	...	..	1
Broncho-pneumonia, chronic endocarditis	....	...	...	1	..	..	...	..	1
Broncho-pneumonia, chronic bronchitis and emphysema	....	...	...	1	..	..	...	..	1
Broncho-pneumonia, senility	....	...	...	...	..	..	...	1	1
Broncho-pneumonia, foreign body in lung	....	...	...	...	..	..	1	..	1
Total broncho-pneumonia									5
Septic pneumonia, streptococcic septicæmia	....	...	...	[2]1	..	..	...	..	1
Septic pneumonia, septic arthritis	....	...	...	1	..	..	...	..	1

1 Transferred to Surgical Division.
2 Left against advice.
3 Cured and improved.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE RESPIRATORY SYSTEM.—Continued.									
Dry pleurisy	4	1	2	1	..	..	...	..	8
Pleurisy with effusion	5	2	14	3	1	..	1	..	26
Pleurisy with effusion, pulmonary thrombosis	....	...	...	...	..	..	...	1	1
Pleurisy with effusion, toxic neuritis	....	1	...	...	..	..	...	..	1
Pleurisy with effusion, carcinoma of the pleura	....	...	...	1	..	..	...	..	1
Chronic pleurisy	....	...	3	2	..	..	...	..	5
Chronic pleurisy, with adherent pericardium, cirrhosis of the liver	....	...	1	...	..	..	...	..	1
Plastic pleurisy	....	...	1	...	..	..	...	..	1
Total pleurisy									44
Acute general miliary tuberculosis	....	...	...	...	..	..	1	1	2
Acute pulmonary tuberculosis	....	...	...	...	..	..	...	2	2
Subacute pulmonary tuberculosis	....	...	3	...	..	..	...	..	3
Subacute pulmonary tuberculosis, secondary syphilis	....	...	...	...	1	..	...	..	1
Incipient pulmonary tuberculosis	....	...	...	1	..	..	...	..	1
Miliary tuberculosis of the lungs, ischiorectal abscess	....	...	...	...	..	..	1	..	1
Tubercular empyema	....	...	1	...	..	..	...	..	1
Tubercular pneumonia	....	...	...	...	..	..	1	1	2
Tubercular pleurisy, tubercular pericarditis	....	...	...	...	..	..	...	1	1
Chronic pulmonary tuberculosis	....	1	23	30	[1]5	3	9	17	88
Chronic pulmonary tuberculosis, tubercular pleurisy	....	...	2	1	..	..	...	1	4
Chronic pulmonary tuberculosis, tubercular laryngitis	....	...	...	...	..	..	1	1	2
Chronic pulmonary tuberculosis, tubercular laryngitis, peritonitis	....	...	...	...	..	..	1	..	1
Chronic pulmonary tuberculosis, tubercular arthritis of ankles	....	...	...	...	..	..	...	1	1
Chronic pulmonary tuberculosis, tubercular kidney	....	...	...	1	..	..	...	1	2

1 One case transferred to St. Joseph's Hospital.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE RESPIRATORY SYSTEM.—Concluded.									
Chronic pulmonary tuberculosis, grippe	....	...	1	...	..	..	...	..	1
Chronic pulmonary tuberculosis, chronic endocarditis (mitral insufficiency)	....	...	...	...	..	..	1	1	2
Chronic pulmonary tuberculosis, pneumothorax	....	...	...	...	..	..	1	..	1
Chronic pulmonary tuberculosis, hydropneumothorax	....	...	...	...	..	..	...	1	1
Chronic pulmonary tuberculosis, general paresis	....	...	...	...	[1]1	..	...	..	1
Chronic pulmonary tuberculosis, cirrhosis of the liver	....	...	...	...	..	..	...	1	1
Chronic pulmonary tuberculosis, chronic gastritis, syphilis	....	...	...	...	..	1	...	..	1
Chronic pulmonary tuberculosis, diabetes, chronic nephritis	....	...	...	...	..	..	1	..	1
Total tuberculosis									121
Fibrosis of the lung	....	...	...	1	..	..	...	..	1
Gangrene of the lung	....	...	1	...	..	..	...	..	1
New growth of the lung	....	...	...	...	1	..	...	..	1
Pulmonary thrombosis	....	...	...	...	..	..	...	1	1
Pulmonary hemorrhage	....	1	...	...	..	..	...	..	1
DISEASES OF THE HEART.									
Acute pericarditis	....	...	1	...	..	..	...	1	2
Acute pericarditis, scarlet fever	....	...	[2]1	...	..	..	...	..	1
Pericarditis, pleurisy with effusion, cystitis	....	...	1	...	..	..	...	..	1
Pericarditis with effusion	....	...	1	...	..	..	...	..	1
Adherent pericardium, interstitial pneumonia	....	...	...	...	..	..	...	1	1
Empyema of pericardium	....	...	...	...	[3]1	..	...	..	1
Purulent pericarditis, double pleurisy with effusion	....	...	1	...	..	..	...	..	1
Total pericarditis									8

1 Transferred to St. Joseph's Hospital.
2 Transferred to Willard Parker Hospital.
3 Transferred to Surgical Division.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE HEART.—Continued.									
Myocarditis	....	...	5	3	..	..	2	..	10
Myocarditis, asthma and emphysema	....	...	1	1	..	..	...	1	3
Myocarditis, chronic bronchitis	....	...	...	1	..	..	...	..	1
Myocarditis, cirrhosis of the liver	....	...	1	...	..	..	...	..	1
Myocarditis, arterio-sclerosis	....	...	...	1	..	..	...	..	1
Myocarditis (post diphtheritic)	1	...	...	...	..	..	...	..	1
Total myocarditis									17
Acute endocarditis	....	...	...	...	..	..	...	1	1
Malignant endocarditis	....	...	...	...	1	..	2	1	4
Malignant endocarditis, chronic peritonitis	....	...	...	...	..	..	...	1	1
Malignant endocarditis, broncho-pneumonia, septicæmia	....	...	...	...	..	..	...	1	1
Total malignant endocarditis									6
Chronic endocarditis	....	...	6	8	..	..	...	1	15
Mitral insufficiency	....	...	4	8	..	..	...	3	15
Mitral stenosis	....	...	...	1	..	..	...	..	1
Mitral stenosis and insufficiency	....	...	1	3	..	..	...	1	5
Mitral and tricuspid	....	...	...	1	..	..	...	..	1
Mitral stenosis and insufficiency, aortic insufficiency	....	...	1	...	..	..	...	..	1
Aortic insufficiency	....	...	2	1	..	..	...	..	3
Aortic stenosis and insufficiency	....	...	1	...	1	..	...	..	2
Aortic and mitral	....	...	...	3	..	..	...	..	3
Aortic and mitral insufficiency	....	...	1	1	..	..	2	..	4
Aortic and mitral stenosis and insufficiency, tricuspid stenosis.	....	...	...	1	..	..	...	..	1
Aortic, mitral and tricuspid stenosis	....	...	...	...	..	..	1	..	1
Aortic stenosis and insufficiency, mitral insufficiency	....	...	1	...	..	..	...	..	1
Chronic endocarditis, ventricular band	....	...	1	...	..	..	...	..	1
Chronic endocarditis, dry pericarditis	....	...	...	...	..	..	...	1	1
Chronic endocarditis, adherent pericardium	....	...	1	...	..	..	...	..	1
Chronic endocarditis, dilated arch of aorta.	....	...	1	...	..	..	...	..	1
Chronic endocarditis, bronchitis	....	...	2	1	..	..	...	..	3
Chronic endocarditis, bronchitis and asthma	....	...	...	1	..	..	...	..	1
Chronic endocarditis, chronic bronchitis, emphysema	....	...	1	2	..	..	...	..	3

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE HEART.—Concluded.									
Chronic endocarditis, empyema	....	...	1	...	..	..	...	..	1
Chronic endocarditis, pyelitis	....	...	...	1	..	..	...	..	1
Chronic endocarditis, toxic insanity	....	...	[1]1	...	..	[1]1	...	..	2
Total chronic endocarditis									68
Acute cardiac dilatation	....	...	1	...	..	..	...	..	1
Cardiac dilatation, delirium cordis	....	...	...	1	..	..	...	..	1
Cardiac dilatation, neurosis, hysteria	....	...	1	...	..	..	...	..	1
Stokes Adams syndrome, general arterio-sclerosis, cirrhosis of the liver	....	...	[1]1	...	..	..	...	..	1
DISEASES OF THE CIRCULATORY SYSTEM.									
Aneurism of the arch of the aorta	....	...	7	1	..	..	...	..	8
Aneurism of the innominate artery	....	...	1	...	..	..	...	..	1
Abdominal aneurism, pancreatic cyst	....	...	...	...	..	..	1	..	1
Aneurism of the arch of the aorta with perforation into the pulmonary artery	....	...	...	...	..	..	1	..	1
Total aneurism									11
Arterio-sclerosis	....	...	2	1	..	..	...	..	3
Arterio-sclerosis, dilated heart	....	...	...	1	..	..	...	..	1
Acute syphilitic aortitis	....	...	1	...	..	..	...	..	1
Cerebral endarteritis with softening	....	...	1	...	..	..	1	..	2
Cerebral thrombosis	....	...	...	...	..	..	...	1	1
Coronary thrombosis	....	...	...	...	..	..	1	..	1
Venous thrombosis	1	...	...	...	..	..	...	..	1
Submeningeal hemorrhages	....	...	...	...	..	..	1	..	1
Phlebitis	....	...	...	1	..	..	...	..	1
DISEASES OF THE DIGESTIVE TRACT.									
Carcinoma of the œsophagus	....	...	...	...	2	..	...	..	2
Carcinoma of the œsophagus, cirrhosis of the liver	....	...	...	...	..	..	1	..	1

1 To Bellevue Hospital.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE DIGESTIVE TRACT.—Continued.									
Acute follicular tonsillitis	4	8	...	1	..	..	...	..	13
Tonsillitis and pharyngitis	1	...	...	...	..	..	...	..	1
Peritonsillar abscess	1	3	...	...	..	..	...	..	4
Acute gastritis	1	...	...	...	..	..	...	..	1
Acute gastritis, hysteria	....	...	...	1	..	..	...	..	1
Acute gastritis, neurasthenia	....	1	...	...	..	..	...	..	1
Acute gastritis, dilated stomach, chronic pulmonary tuberculosis	....	...	...	1	..	..	...	..	1
Alcoholic gastritis	....	...	1	2	..	..	...	..	3
Alcoholic gastritis, multiple neuritis	....	...	...	1	..	..	...	..	1
Sub-acute gastritis	1	...	...	1	..	..	...	..	2
Chronic gastritis	....	2	2	4	..	..	...	..	8
Chronic gastritis, neurasthenia	....	...	...	1	..	..	...	..	1
Chronic gastritis, gastroptosis	....	...	...	1	..	..	...	..	1
Hyperchlorhydria	....	...	1	...	..	..	...	..	1
Chronic indigestion	....	...	...	1	..	..	...	..	1
Gastric neurosis, gastralgia	....	...	1	...	..	..	...	..	1
Gastro-enteritis	3	4	...	...	..	..	...	..	7
Gastric ulcer	1	9	2	5	[1]1	..	...	..	18
Gastric ulcer with perforation	....	...	...	...	..	1	...	..	1
Gastric ulcer and carcinoma	....	...	...	1	..	..	...	..	1
Duodenal ulcer	....	...	...	...	..	..	1	..	1
Appendicitis with abscess	....	...	...	...	[1]1	..	...	..	1
Sub-acute appendicitis	....	...	...	...	[1]1	..	...	..	1
Chronic appendicitis	....	...	1	[2]2	..	..	...	..	3
Carcinoma of the stomach	....	...	1	2	[1]1	1	3	..	8
Carcinoma of the stomach, pneumonia	....	...	...	...	..	..	1	..	1
Carcinoma of the stomach, splenomegaly	....	...	...	...	1	..	...	..	1
Carcinoma of the stomach and liver	....	...	1	...	..	..	2	..	3
Carcinoma of the stomach, drug habit	....	...	...	...	..	1	...	..	1
Carcinoma of the rectum	....	...	...	...	1	[2]2	...	..	3
Carcinoma of the rectum, diphtheria	....	...	...	...	..	..	...	1	1
Sub-acute colitis	1	2	...	...	..	..	...	..	3
Ulcerative colitis	....	3	...	...	..	..	...	..	3
Chronic colitis	....	1	1	...	..	..	...	..	2
Dysentery	....	...	...	1	..	..	...	..	1
Amœbic dysentery	1	...	1	1	..	..	...	..	3
Diarrhœa	4	...	...	...	..	..	...	..	4

1 To Surgical Division.
2 One case sent to Surgical Division.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE DIGESTIVE TRACT.—Concluded.									
Acute diarrhœa of unknown cause	....	...	...	...	..	..	1	..	1
Chronic diarrhœa	....	...	...	...	1	..	...	..	1
Intestinal ulcer, sub-acute rheumatism	....	...	1	...	..	..	...	..	1
Acute constipation	2	1	1	...	..	..	...	..	4
Chronic constipation	....	...	...	1	..	..	...	..	1
Constipation, intestinal toxæmia	....	1	...	...	..	..	...	..	1
Cirrhosis of the liver	....	...	5	2	..	..	4	4	15
Cirrhosis of the liver, heart block	....	...	1	...	..	..	...	..	1
Cirrhosis of the liver, dilated arch of aorta, aortic insufficiency	....	...	1	...	..	..	...	..	1
Cirrhosis of the liver, adherent pericardium	....	...	1	...	..	..	...	..	1
Cirrhosis of the liver, pericarditis, hydrothorax, ascites	....	...	1	...	..	..	...	..	1
Cirrhosis of the liver, chronic nephritis	....	...	4	...	..	..	...	..	4
Cirrhosis of the liver, chronic pulmonary tuberculosis	....	...	...	...	..	..	1	..	1
Cirrhosis of the liver, cholecystitis	....	...	1	...	..	..	...	..	1
Cirrhosis of the liver, catarrhal colangitis	....	...	1	...	..	..	...	..	1
Cirrhosis of the liver, alcoholic gastritis, chronic alcoholism	....	...	1	...	..	..	...	..	1
Cirrhosis of the liver, acute alcoholism	....	...	...	...	1	..	...	..	1
Cirrhosis of the liver, chronic alcoholism, chronic cystitis	....	...	...	...	..	..	1	..	1
Cirrhosis of the liver, delirium tremens, erysipelas	1	...	...	...	..	..	...	..	1
Cirrhosis of the liver, multiple alcoholic neuritis, hydropericardium, hydrothorax, terminal pneumonia	....	...	...	...	..	..	...	1	1
Cirrhosis of the liver, chronic cystitis	....	...	...	...	..	..	1	..	1
Cirrhosis of the liver, inguinal hernia	....	...	...	...	1	..	...	..	1
Total cirrhosis of the liver									33
Catarrhal jaundice	1	...	...	...	..	..	...	..	1
Cholelithiasis	1	...	1	1	..	..	...	..	3
Cholelithiasis, pancreatitis	....	...	...	...	..	..	...	1	1
Acute perihepatitis	....	1	...	...	..	..	...	..	1
Cholæmia (carcinoma of the liver?)	....	...	...	...	..	..	1	..	1
Suppurative cholangitis, abscesses of the liver, general peritonitis	....	...	...	...	..	..	...	1	1
Carcinoma of the gall bladder	....	...	...	...	..	..	...	1	1
Carcinoma of the gall ducts and liver	....	...	...	...	..	..	...	1	1

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE KIDNEYS.									
Acute nephritis	1	...	...	...	..	..	...	..	1
Sub-acute nephritis	....	...	...	1	..	2	...	..	3
Sub-acute nephritis, chronic endocarditis	....	...	...	...	..	..	...	2	2
Chronic parenchymatous nephritis	....	...	1	...	..	..	...	..	1
Chronic interstitial nephritis	....	...	16	8	1	[1]1	8	5	39
Chronic interstitial nephritis, pericarditis	....	...	...	...	..	..	2	..	2
Chronic interstitial nephritis, myocarditis	....	...	2	...	..	..	1	1	4
Chronic interstitial nephritis, chronic endocarditis	....	...	3	1	..	..	3	3	10
Chronic interstitial nephritis, pericarditis, chronic endocarditis	....	...	...	...	..	..	...	1	1
Chronic interstitial nephritis, dilated aorta	....	...	...	1	..	..	...	1	2
Chronic interstitial nephritis, arterio-sclerosis	....	...	...	1	..	..	...	..	1
Chronic interstitial nephritis, cerebral hemorrhage, hemiplegia	....	...	...	...	..	..	1	..	1
Chronic interstitial nephritis, acute pleurisy with effusion	....	...	1	...	..	..	...	..	1
Chronic interstitial nephritis, pleurisy with effusion, apoplexy	....	...	...	...	..	..	1	..	1
Chronic interstitial nephritis, chronic pulmonary tuberculosis	....	...	1	...	..	..	1	1	3
Chronic interstitial nephritis, chronic pulmonary tuberculosis, myocarditis	....	...	1	...	..	..	...	..	1
Chronic interstitial nephritis, acute nephritis with exudation	....	...	1	1	..	..	...	..	2
Chronic interstitial nephritis, chronic gout	....	...	1	...	..	..	...	..	1
Chronic interstitial nephritis, acute pancreatitis with jaundice	....	...	...	1	..	..	...	..	1
Total chronic nephritis									70
Renal colic	....	1	...	...	..	..	...	..	1
Pyelitis	2	2	...	[2]3	..	..	...	..	7
Pyelitis, cystitis	....	1	...	...	..	..	...	..	1
Pyelonephritis	....	...	[3]1	...	..	..	1	..	2
Pyelonephrosis	1	...	...	...	..	..	...	..	1
Tubercular kidney	....	...	...	...	..	[4]1	...	..	1

1 Left against advice.
2 One case left against advice.
3 Transferred to Bellevue Hospital.
4 Transferred to Surgical Division.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE REST OF THE GENITO-URINARY TRACT.									
Cystitis	....	3	...	2	..	..	...	..	5
Papilloma of the bladder, gonorrheal arthritis of the spine and jaws	....	...	...	[1]1	..	..	...	..	1
Acute gonorrhea, malaria	....	...	1	...	..	..	...	..	1
Stricture of the urethra, cystitis	....	...	1	...	..	..	...	..	1
Hydrocele, acute epididymitis	....	...	1	...	..	..	...	..	1
DISEASES OF THE JOINTS.									
Acute articular rheumatism	14	11	3	2	..	..	...	..	30
Acute articular rheumatism, acute endocarditis	....	...	2	...	..	..	...	..	2
Acute articular rheumatism, acute endocarditis, melancholia	....	...	...	...	..	[2]1	...	..	1
Acute articular rheumatism, pericarditis	....	[3]1	...	...	..	..	...	..	1
Acute articular rheumatism, adherent pericardium	1	...	...	...	..	..	...	..	1
Acute articular rheumatism, hydropericardium	....	1	...	...	..	..	...	..	1
Acute articular rheumatism, chronic endocarditis	1	2	4	6	..	..	...	..	13
Acute articular rheumatism, chronic nephritis, uræmia	....	...	...	...	..	..	1	..	1
Acute articular rheumatism, purpura rheumatica	....	1	...	...	..	..	...	..	1
Total acute articular rheumatism									51
Sub-acute articular rheumatism	8	4	...	2	..	..	...	..	14
Total sub-acute articular rheumatism									14
Chronic rheumatism	....	...	...	6	..	..	...	..	6
Chronic rheumatism, arthritis deformans	....	...	...	1	..	..	...	..	1
Chronic rheumatism, chronic endocarditis, pleurisy with effusion, hemiplegia	....	...	...	1	..	..	...	..	1
Rheumatism, tubercular adenitis	....	...	...	[4]1	..	..	...	..	1
Total chronic rheumatism									9

1 Transferred to Surgical Division.
2 Transferred to Bellevue Hospital.
3 And improved.
4 And unimproved.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE JOINTS.—Concluded.									
Arthritis deformans	....	...	1	5	..	..	...	..	6
Rheumatoid arthritis	....	...	1	3	..	..	...	..	4
Osteo-arthritis of hip	....	...	1	...	[1]1	..	...	..	2
Chronic arthritis of hip aud knee	....	...	...	...	1	..	...	..	1
Chronic arthritis of knee (septic)	....	...	...	1	..	..	...	..	1
Gonorrheal arthritis	2	1	1	...	..	..	...	..	4
Syphilitic arthritis of knee	....	...	1	1	..	..	...	..	2
Traumatic synovitis	1	...	...	...	..	..	...	..	1
Gout	....	...	2	2	..	..	...	..	4
Peliosis rheumatica	....	1	...	...	..	..	...	..	1
DISEASES OF NUTRITION.									
Diabetes mellitus	....	...	...	4	..	..	2	..	6
Diabetes mellitus, chronic pulmonary tuberculosis	....	...	2	1	..	1	...	..	4
Diabetes mellitus, chronic nephritis	....	...	1	...	..	..	...	..	1
Diabetes mellitus, chronic nephritis, diphtheria	....	...	...	...	..	..	1	..	1
Diabetes mellitus, neuralgia	....	...	...	1	..	..	...	..	1
Diabetes mellitus, gangrene of toe	....	...	...	1	..	..	...	..	1
Total diabetes									14
DISEASES OF THE BLOOD.									
Pernicious anæmia	....	...	2	...	1	..	1	..	4
Secondary anæmia	....	2	...	2	..	..	...	..	4
Acute lymphatic leukæmia	....	...	1	...	..	..	...	..	1
Myelogenous leukæmia	....	...	2	...	..	..	...	..	2
Hodgkin's disease	....	...	...	2	..	1	...	..	3
Hemophilia	....	...	...	1	..	..	...	..	1
Purpura hemorrhagica	....	...	...	...	..	..	1	1	2
DISEASES OF THE DUCTLESS GLANDS.									
Exophthalmic goitre	....	...	...	[2]3	..	..	...	1	4
Exophthalmic goitre, mitral stenosis	....	...	...	1	..	..	...	..	1
Myxœdema	....	...	...	1	..	..	...	..	1

1 Transferred to Orthopædic Division.
2 One case transferred to Surgical Division.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
DISEASES OF THE NERVOUS SYSTEM.									
Hysteria	....	...	1	4	1	[1]1	...	..	7
Neurasthenia	....	...	6	8	..	1	...	..	15
Neurasthenia, gastric neurosis	....	...	2	1	..	..	...	..	3
Traumatic neurasthenia, cirrhosis of the liver	....	...	1	...	..	..	...	..	1
Nervous exhaustion	....	...	...	2	..	..	...	..	2
Pseudoangina pectoris	....	...	...	5	..	..	...	..	5
Gastric neurosis	....	...	...	1	..	..	...	..	1
Headache	....	1	...	...	..	..	...	..	1
Migraine	....	1	1	4	..	..	...	..	6
Migraine, ophthalmoplegia	....	...	...	1	..	..	...	..	1
Traumatic neurosis	....	...	1	...	..	..	...	..	1
Acute dementia	....	...	...	...	..	1	...	..	1
Melancholia	....	...	...	[2]1	[2]1	1	...	..	3
Paranoia	....	...	...	...	..	[2]1	...	..	1
Alcoholic neuritis	....	...	...	1	..	1	...	..	2
Alcoholic neuritis, Korsikoff's syndrome, acute alcoholic encephalitis	....	...	...	...	..	..	...	1	1
Multiple neuritis	....	...	[3]2	1	..	1	...	..	4
Neuritis, phlebitis	....	...	1	...	..	..	...	..	1
Brachial neuritis	....	...	1	...	..	..	...	..	1
Sciatica	1	...	2	5	..	1	...	..	9
Concussion of the brain	....	...	...	1	..	..	...	..	1
Hemiplegia	....	...	1	3	..	..	...	..	4
Hemiplegia, pneumonia	....	...	...	...	..	..	...	1	1
Cerebral hemorrhage	....	...	1	1	..	..	...	..	2
Hemorrhage into spinal cord	....	...	1	...	..	..	...	..	1
Facial paralysis	....	...	1	...	..	..	...	..	1
Muscular atrophy	....	...	...	...	..	1	...	..	1
Tabes dorsalis	....	...	4	1	..	..	...	..	5
Disseminated myelitis	....	...	1	...	..	..	...	..	1
Spastic ataxia	....	...	1	...	..	..	...	..	1
Multiple sclerosis	....	...	...	...	..	1	...	..	1
Syringomyelia, acute dementia	....	...	...	...	..	..	1	..	1
SURGICAL DISEASES.									
Brain tumor	....	...	...	...	[4]2	..	...	..	2
Brain tumor, lobar pneumonia	....	...	...	[4]1	..	..	...	..	1
Tumor of cord	....	...	...	...	..	[4]1	...	..	1

1 Left against advice.
2 Transferred to Bellevue Hospital.
3 One case to Lincoln Hospital.
4 Transferred to Surgical Division.

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
SURGICAL DISEASES.—Concluded.									
Otitis media	....	3	...	...	..	..	...	..	3
Thrombosis of lateral sinus	....	...	...	...	*1	*1	...	..	2
Infected chin	....	1	...	...	..	..	...	..	1
Carcinoma of the larynx	....	...	...	...	1	..	...	..	1
Empyema	....	...	1	...	1	*1	...	..	3
Typhoid fever, perforation, general peritonitis	....	...	...	...	..	..	...	1	1
Spreading peritonitis	....	...	...	...	..	1	...	..	1
Abscess of the liver	....	...	...	...	*1	..	...	..	1
Subphrenic abscess	....	...	...	...	*2	..	...	..	2
Empyema of the gall bladder	....	...	...	...	..	1	...	..	1
Intestinal obstruction	....	...	...	...	*1	..	...	..	1
Infected finger	....	3	...	1	..	..	...	..	4
Infected foot	....	1	...	...	..	..	...	..	1
Infected heel	....	2	...	...	..	..	...	..	2
Infected toe	....	2	...	...	..	..	...	..	2
Perforating ulcer of foot	....	...	...	...	*1	..	...	..	1
Popliteal abscess	....	...	...	...	*1	..	...	..	1
Septic arthritis	....	...	...	...	..	*1	...	..	1
Suppurative arthritis of elbow	....	...	...	...	..	*1	...	..	1
Stricture of urethra, acute retention of urine	....	...	...	...	*1	..	...	..	1
Hallux valgus	....	...	...	...	..	*2	...	..	2
Fibroid uterus	....	...	...	...	..	*1	...	..	1
Fibromyoma, pyosalpinx	....	...	...	*1	..	..	...	..	1
Ovarian cyst	....	...	...	...	..	*1	...	..	1
Sarcoma of ovary	....	...	...	1	..	..	...	..	1
Pelvic abscess	....	...	...	...	..	*2	...	..	2
Multiple abscesses	....	...	...	...	*1	..	...	..	1
MISCELLANEOUS DISEASES.									
Poisoning.									
Acute morphinism	1	...	...	...	..	..	...	..	1
Chronic morphinism	....	...	...	...	..	1	...	..	1
Chronic tobacco poisoning	....	...	1	...	..	..	...	..	1
Ivy poisoning	....	1	...	...	..	..	...	..	1
Heroin habit	....	...	1	...	..	..	...	..	1
Acute alcoholism	8	...	...	...	1	..	...	..	9
Acute alcoholism, delirium tremens	....	2	...	...	..	..	...	..	2
Acute and chronic alcoholism	....	...	...	...	2	..	...	..	2
Chronic alcoholism, malnutrition	....	...	2	...	..	..	...	..	2

* Transferred to Surgical Division..

	Cured		Improved		Unimproved		Died		TOTAL
	M	F	M	F	M	F	M	F	
MISCELLANEOUS DISEASES.—Concluded.									
Intestinal Parasites.									
Tape worm	....	...	...	...	1	..	...	..	1
Anchylostoma duodenalis	....	...	1	...	..	..	...	..	1
Tænia bothriocephalus	....	1	...	...	..	..	...	..	1
Trichinosis	1	...	...	...	..	..	...	..	1
Filiariasis	....	...	1	1	..	..	...	..	2
No medical condition	....	...	...	1	1	..	...	..	2
Senility	....	...	...	...	..	..	...	1	1
Senility, pleurisy, varicose veins	....	...	1	...	..	..	...	..	1
Exhaustion	....	1	...	...	..	..	...	..	1
Heat exhaustion, chronic rheumatism	....	...	...	1	..	..	...	..	1
Malnutrition, neurasthenia	....	...	...	1	..	..	...	..	1
Myasthenia gastrica	....	...	...	1	..	..	...	..	1
Acne	....	...	...	1	..	..	...	..	1
Eczema	2	...	1	...	..	..	...	..	3
Erythema exudativum	....	1	...	...	..	..	...	..	1
Herpes zoster	1	...	2	1	..	..	...	..	4
Lumbago	2	1	...	...	..	..	...	..	3
Myalgia	1	...	...	...	..	..	...	..	1
Rheumatic iritis	....	...	1	1	..	..	...	..	2
Inflammation of eye	....	...	...	1	..	..	...	..	1
Retinitis	....	...	1	...	..	..	...	..	1
Ulcer of cornea	1	...	...	...	..	..	...	..	1
Labyrinthine disease, Eustachian catarrh	....	...	...	1	..	..	...	..	1
Antrum disease	1	...	...	...	..	..	...	..	1
Vincent's angina	....	1	...	...	..	..	...	..	1
Vomiting of pregnancy	....	...	...	1	..	..	...	..	1
Splanchnoptosis	....	...	...	5	..	..	...	..	5
Benign pyloric stricture	....	...	...	1	..	..	...	..	1
Tubercular polyserositis	....	...	...	...	..	..	1	..	1
Tubercular hips, amyloid viscera	....	...	...	...	..	..	1	..	1
New growth of mediastinum	....	...	...	...	1	..	...	..	1
Flat Foot	....	...	...	2	..	..	...	..	2
Pott's disease of the spine	....	...	1	1	..	..	...	[1]1	3
Dysmenorrhea	....	...	...	...	..	[2]2	...	..	2
Carcinoma of uterus and stomach	....	...	...	1	..	..	...	..	1
Pelvic abscess	....	1	...	...	..	..	...	..	1
Pelvic adhesions	....	...	...	1	..	..	...	..	1
Salpingitis	....	...	...	2	..	..	...	..	2
Carcinoma of vagina	....	...	...	...	..	1	...	..	1
Carcinomatosis	....	...	1	...	..	..	...	..	1
Sarcomatosis	....	...	...	...	..	..	1	..	1
Totals	197	200	261	276	49	48	102	95	1228

1 Pulmonary embolus.
2 One case to Surgical Division.

THE EFFECTS OF HEMORRHAGE IN TYPHOID FEVER.

Dr. Austin W. Hollis.

The tables at the end of this article give detailed statistics of intestinal hemorrhage occurring in typhoid fever patients at St. Luke's Hospital during the last ten years.

Thomas McCrae in Modern Medicine. Osler, Vol. II.. gives 7 as the estimated percentage of intestinal hemorrhage in a large series of cases from all sources.

In 720 cases of typhoid in the Montreal General Hospital he found hemorrhage in 10%.

In the London Fever Hospitals, 8,356 cases had hemorrhage in 8.44 per cent. Curschmann, 1.626 cases, found hemorrhage in 6.33 per cent., with a mortality in the hemorrhage cases of 38 per cent. The largest amount of blood lost was 2,550 c. c. The period of greatest frequency was toward the end of the second week and during the third.

In our series of cases, out of a total of 963, hemorrhage occurred in 12.24 per cent. The general mortality was 11.84 per cent, with a mortality of 41.53 per cent. in the hemorrhagic and 7.7 per cent. in the non-hemorrhagic cases. The hemorrhage occurred most frequently during the fourth week, next during the third, and after that the fifth. The earliest day was the 7th. This patient lost 20 ounces on the 7th day and 7 ounces on the 8th and died on the 10th day. Another lost 18 ounces on the 9th day, 16 ounces on the 11th day and died on the 17th day. One patient lost 138 ounces on the 13th and 15th days and died on the 15th day. The latest day on which a hemorrhage occurred was the 58th, during a relapse. The largest total amount was 138 ounces (3,080 c. c.) in two hemorrhages, on the 13th and 15th days, followed by death on the 15th day.

One patient lost 97 ounces (2,826 c. c.) on the 27th day and died on the same day. One lost 89 ounces during a period of 11 days and recovered. One lost 77 ounces on the 17th day and 1 ounce on the 21st day and recovered. One lost 72 ounces in a period of 5 days and recovered. One lost 88 ounces between the 12th and 17th days and

recovered. Two cases had almost continuous hemorrhage, death rapidly ensuing.

The largest single hemorrhage was 50 ounces.

Effect on the Temperature.—Small and medium-sized hemorrhages in the great majority of cases had no effect on the temperature. Sometimes, in the same case, a medium-sized hemorrhage was followed by a rise, and at some other time the same amount would be followed by a fall, or *vice versa,* which seems to mean that the variation was due to some other cause. In large hemorrhages, between 20 and 50 ounces, a sudden fall of several degrees, sometimes to normal, was the usual course. As a rule, after a few hours fever again ensued but in a few cases fever did not return and convalescence set in. In a few other cases, after large hemorrhages there was no change in temperature.

Effects on the Pulse.—Small and medium-sized hemorrhages had no appreciable effect on the pulse rate. In a few cases a sudden rise was noted, which may probably be ascribed to nervousness. In large hemorrhages about half the cases had a sudden acceleration from 10 to 40 beats per minute; in the other half there was either no change or there was a retardation of 10 to 20 beats per minute. It seemed very clear that when a large hemorrhage was followed by a decided rise in pulse rate, the prognosis was bad but, if the pulse was unchanged or slowed, the patient always did well.

Effect on the Blood.—There were only isolated cases in which blood counts were made and the hemoglobin and the coagulation period tested. It is obvious that, in such profoundly sick cases these tests cannot be thoroughly made without serious prejudice to the welfare of the sufferer.

Effect on the Duration of the Disease.—As regards death, the most fatal period was about the 27th day. Death after the 30th day was quite infrequent. In those who lived, fever, as a rule, seemed prolonged. Very few reached an entirely normal state before the 40th day. The majority ran a febrile course over sixty days and one was prolonged to 116 days.

Effect on the Mortality.—The mortality in hemorrhage cases was 41.53 per cent., compared with 7.7 per cent. in those without hemorrhage. It would, however, be a very superficial view to attribute this high mortality directly to the loss of blood. Hemorrhage is decidedly

more frequent in the more seriously infected cases. Cases with hemorrhage belong most certainly to those infected with Eberth's bacillus. In the non-hemorrhage cases the infection may be paratyphoid or due to some other colon bacillus, and is seldom of a fatal character. Hemorrhage cases have intestinal ulcerations, which allow of more general toxic absorption. The presence of ulcerations show a less resistant individual. Ulcerations permit of perforations which are an additional factor in the mortality. There is, indeed, only a small percentage of cases in which one can immediately trace the mortality to the loss of blood. In two cases, excessively large hemorrhages, 138 ounces in one and 98 ounces in the other, were almost immediately followed by death, and in two others the hemorrhage was almost continuous before death. In twelve others, the amount of blood lost was perhaps sufficient to have been the deciding factor in causing death, although in such seriously infected cases death might have been probable even without hemorrhage. However, it may be conceded that, in 16 per cent. of fatal hemorrhage cases, loss of blood is the direct cause, while in 6.78 per cent. it is due to perforation, in 5 per cent. to pneumonia and other complications, and in the remaining 72 per cent. to vital failure from toxæmia.

In the 118 hemorrhagic cases, 6.78 per cent. perforated, which is double the percentage in non-hemorrhagic cases.

Beneficial Effects.—It is the practical experience of almost every clinician that occasionally, after a serious hemorrhage, the temperature falls, there is a reduction in pulse rate and a cessation of active symptoms, although one more frequently notes, after a moderate or medium-sized hemorrhage, an improvement in the mental state and better gastro-intestinal assimilation. That there is ever a direct shortening of the febrile period or of the disease, as a whole, would be difficult to prove, but there are several cases in our series that are worthy of study because of their short or favorable termination.

Case No. 47, Vol. 119. There were small hemorrhages on the 8th, 9th, 10th, 11th, 12th, 13th days; 19 ounces in all. Temperature became normal on the 20th day.

No. 40, Vol. 115. Hemorrhage on the 25th, 26th, 27th days; 35 ounces in all. Temperature normal on the 32d day.

No. 148, Vol. 89. Hemorrhage on the 13th, 14th, 15th, 16th, 17th, 20th days; 34 ounces in all. Temperature normal on the 27th day.

No. 15, Vol. 68. Hemorrhage on the 22d, 25th, 35th days. Forty-eight ounces on the 35th day. Temperature normal on the 38th day.

No. 149, Vol. 76. Seventeen ounces on the 8th day and 40 ounces on the 13th day. Temperature normal on the 19th day.

No. 198, Vol. 63. Seven ounces on the 10th day. Temperature normal on the 19th day.

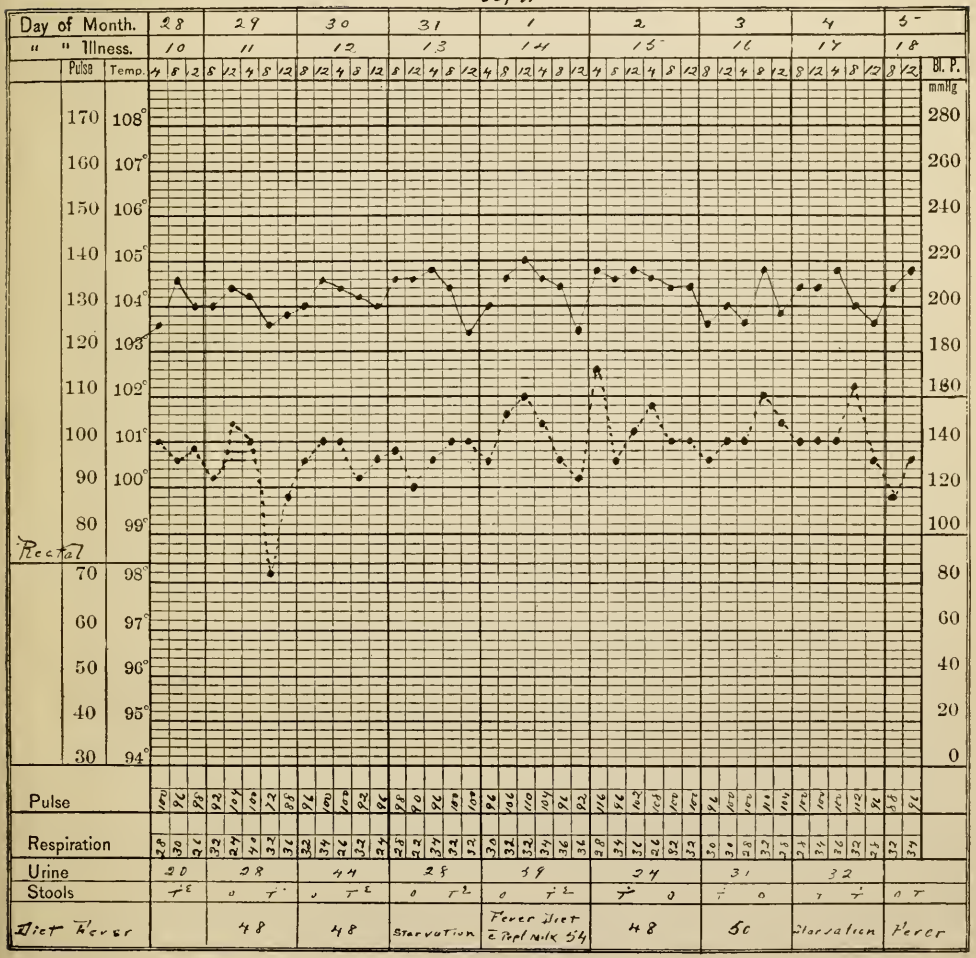
Although the study of hemorrhage in typhoid fever must impress one with its seriousness, nevertheless, as the vigorous and abundantly healthy seem in general to be more severely infected than the anæmic and feeble, and as it is a fully proven fact that in children whose immunity and blood quality has not been developed the mortality is exceedingly small, one might well hope that depletion might exert some favorable influence. With this thought in view, during my service in the fall of 1908, I performed venesection on two cases in which most severe and ominous toxic symptoms had arisen.

Case I.—P., male, 26 years. Entered the hospital on the 10th day of his illness. He was seriously sick, and notwithstanding cold tub baths, his fever was steadily maintained between 104 and 105 till the end of the third week, when he became profoundly toxic and had muttering delirium. On the 19th day, 12 ounces of blood were removed from the median cephalic vein. Following this there was a marked change in his color and mental condition. He was no longer dusky and he was entirely free from delirium. The temperature averaged a degree lower. On the 26th day the temperature reached 100⅗, and there was marked general improvement. On the 27th day, there was an intercurrent relapse, with increasing fever, which continued without abatement till death on the 36th day from vital exhaustion. This case might be described as a virulent one, in which the prognosis from the very beginning would have been extremely grave.

ST. LUKE'S HOSPITAL.

Case No. [illegible]

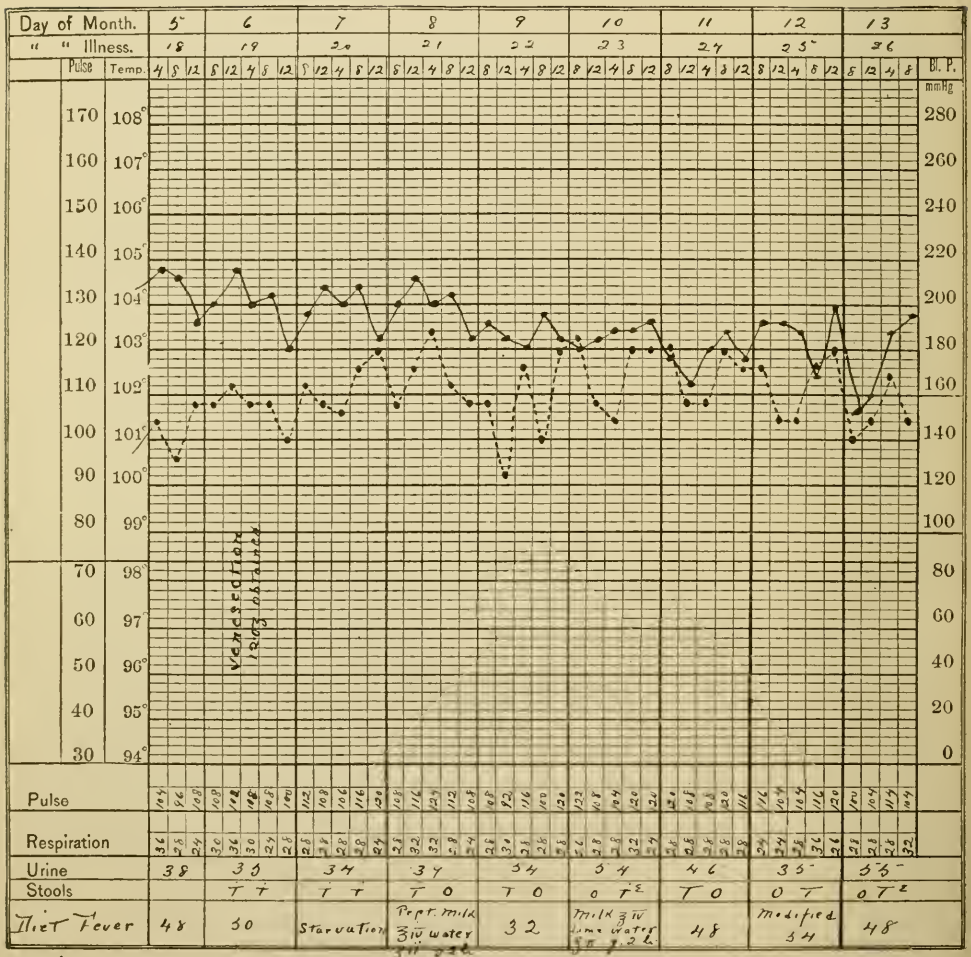
Name Mr Pagenas Admitted Aug 28 - '08 Sept. Ward Morris III


Day of Month. 28 29 30 31 1 2 3 4 5
" " Illness. 10 11 12 13 14 15 16 17 18
Pulse Temp. Bl. P. mmHg
Rectal
Pulse
Respiration
Urine 20 28 44 28 39 34 31 32
Stools
Diet Fever 48 48 Starvation Fever Diet & Pepl Milk 54 48 60 Convalescent Fever
Weight 143½ lbs.
Hist Form 5

ST. LUKE'S HOSPITAL.

Case No. 7 4 7 9 4

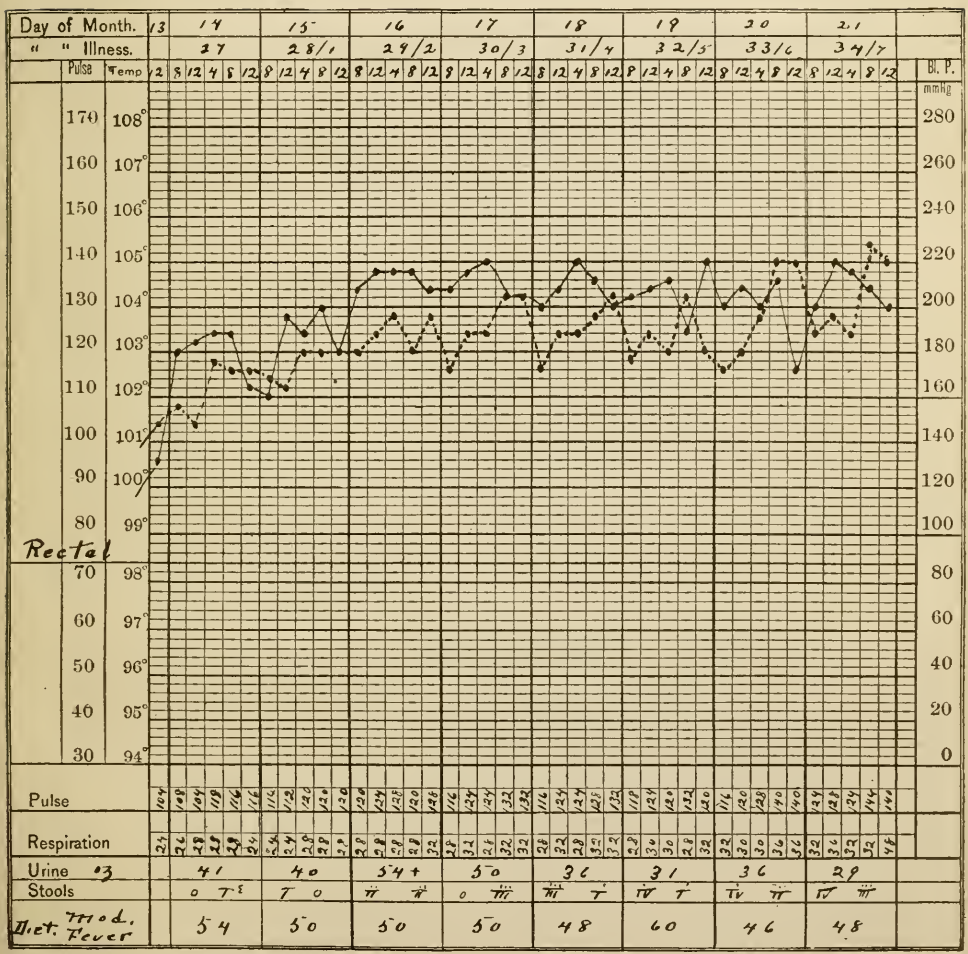
Name Mr Pagaras Admitted Aug 28 - 08 Ward Morris 1st.



ST. LUKE'S HOSPITAL.

Case No. 74794

Name Mr Paperas Admitted Aug 28-08 Ward Morris III



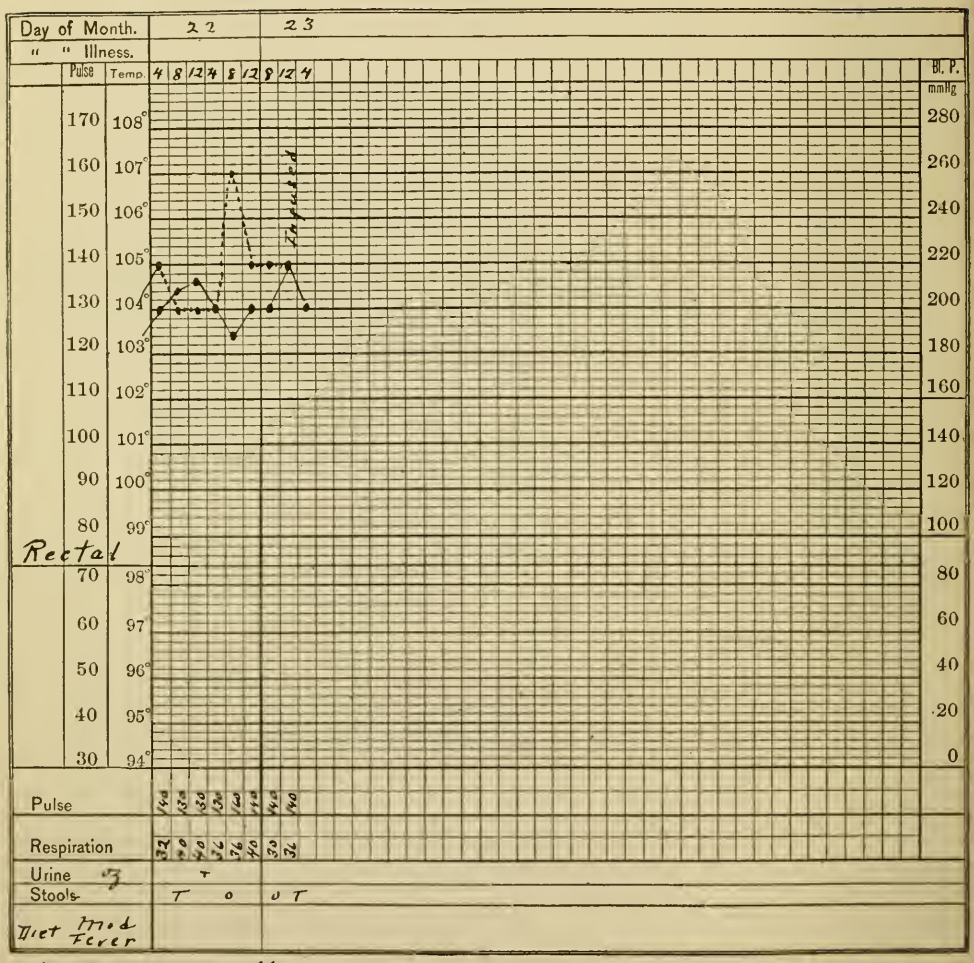
Weight 120½

Hist. Form 5

ST. LUKE'S HOSPITAL.

Case No. 74794

Name Mr Pagano Admitted Aug. 28-08 Ward



Weight 116½ lbs

W.B.C 4200

P. 42

L. 58

Hist. Form 5.

Case II.—J. D., male, 18 years. Entered the Hospital on the 15th day of the disease, temperature averaging 104. He appeared very sick. On the 19th day he was exceedingly restless and toxic. His pulse, which had been averaging 120, ran up to 160 and he appeared greatly distressed. The following day, venesection was performed and 12 ounces of blood removed. Three hours afterwards the pulse again reached 160 but the following day he was quieter, the pulse being between 120 and 130. He made a slow recovery, the temperature becoming normal on the 42d day. His pulse was always an irritable one, and, during convalescence, when he sat up, it averaged between 120 and 130. I attributed this to the toxic effect of the disease upon the heart as was noted before the venesection.

ST. LUKE'S HOSPITAL.

Case No. 7497b

Name Mr James D Admitted 9-17-08 Ward Private

1908 Sept

Day of Month.	17	18	19	20	21	22	23	24	25
" " Illness.	15	16	17	18	19	20	21	22	23

Pulse / Temp. / Bl. P. mmHg

Pulse	Temp.	Bl. P. mmHg
170	108°	280
160	107°	260
150	106°	240
140	105°	220
130	104°	200
120	103°	180
110	102°	160
100	101°	140
90	100°	120
80	99°	100
Rectal		
70	98°	80
60	97°	60
50	96°	40
40	95°	20
30	94°	0

Vomited a little bile after breakfast

Pulse									
Respiration									
Urine	14	32	16	28	14 + unmeas.	incont 13 +	39		
Stools	T	T T	0 T	0 T T	T T	T T	T T	T T	T T
Diet Fever	30	48	48	46	46	30	50		

WBC 7600
P 79
L 21

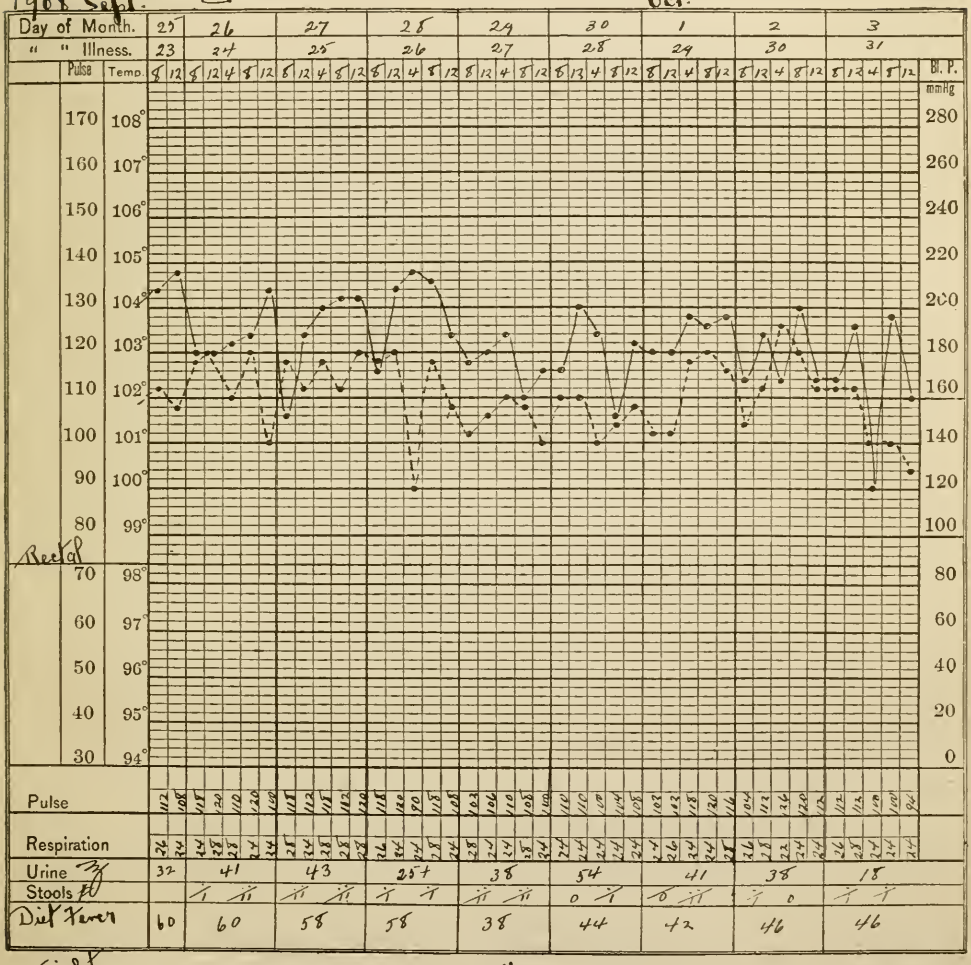
Hist. Form 8.

ST. LUKE'S HOSPITAL.

Case No. 74976

Name Mr James D Admitted 9-17-08 Ward Nurses III

1908 Sept. Oct.



Weight 49 lbs

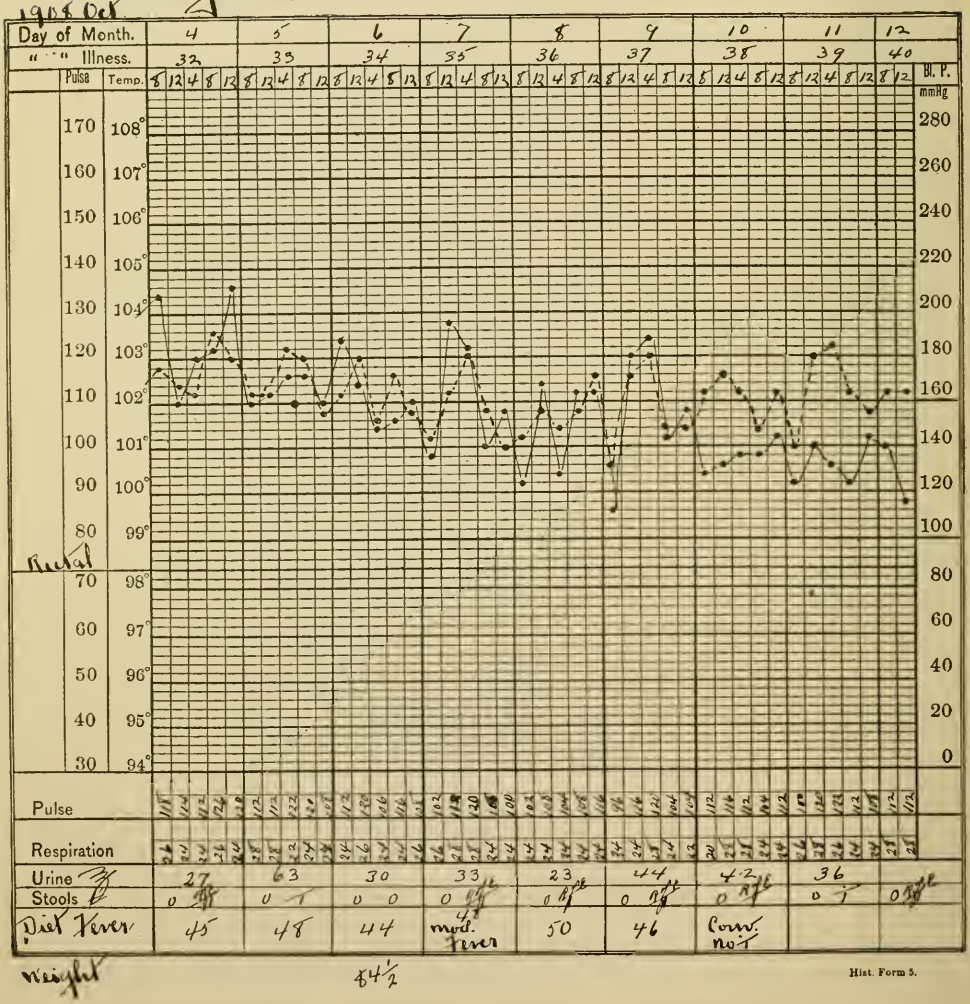
Hist. Form 5.

ST. LUKE'S HOSPITAL.

Case No. 74976

Name Mr. James D. Admitted 9-17-08 Ward Norris III

1908 Oct

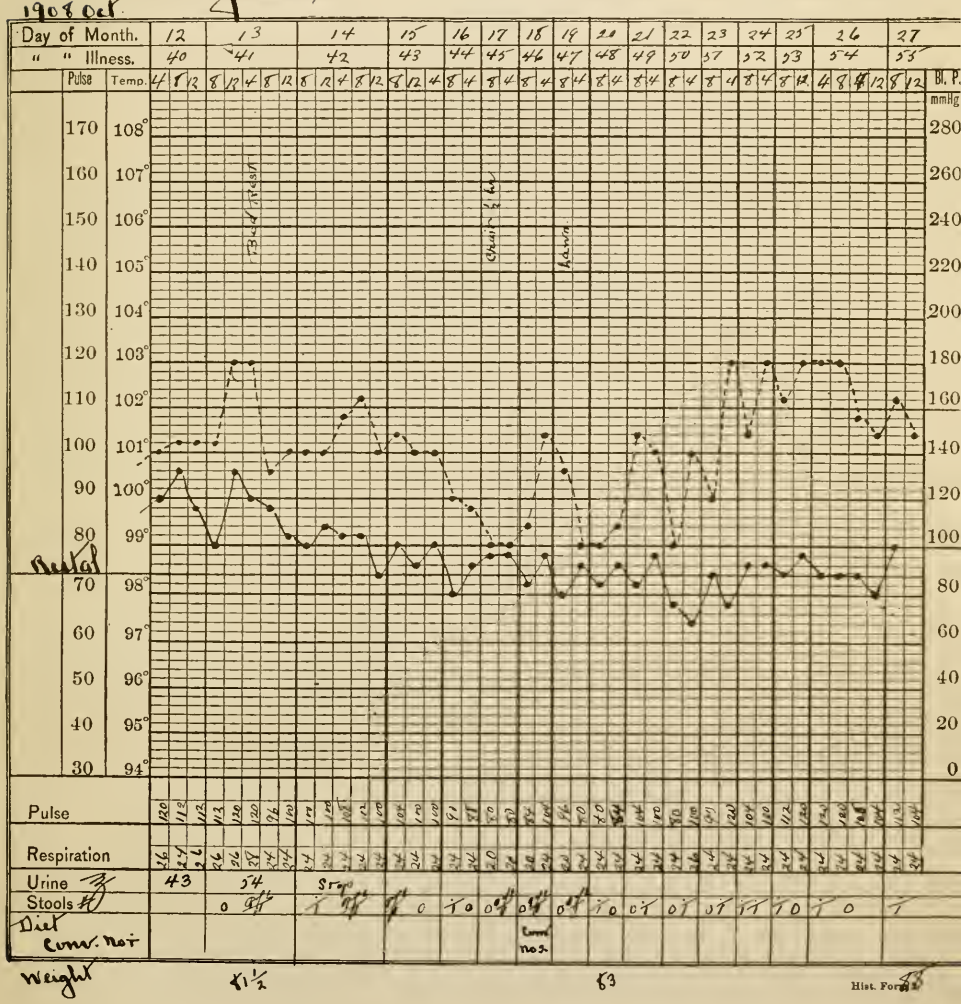


ST. LUKE'S HOSPITAL.

Case No. 74976

Name Mr James H. Admitted 9-17-08 Ward Room 11

1908 Oct



1907.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 35	26	6 oz.	Temperature fell from 103.4° to 102°. No change in pulse.
Vol. 125	27	2 oz.	No effect on temperature and pulse. Temperature normal on 53rd day.—Cured.
No. 180	23	6 oz.	No change in temperature and pulse.
Vol. 125	24	3 oz.	" " " " " "
	25	1 oz.	" " " " " " On 31st day many subcutaneous hemorrhages appeared on chest, many petechiæ on body.—Patient died 31st day.
No. 166	13	1 dram	No effect on temperature and pulse.
Vol. 126		2 drams	" " " " " " Temperature normal on 46th day. Relapse beginning on 48th day. Temperature normal 76th day.—Cured.
No. 169	14	5 oz.	No effect on temperature and pulse.
Vol. 126		6 oz.	" " " " " "
		5 oz.	Temperature rose 103° to 103.6°. Pulse rose 104 to 120.
	15	5 oz.	No effect on temperature and pulse.
		5 oz.	" " " " " "
		4 oz.	" " " " " "
	16	4 oz.	" " " " " "
		5 oz.	No effect on temperature. Pulse rose 108 to 120. On the 17th day the temperature, which had been running from 103° to 104° for nine days, remained about 102° and then gradually fell to normal on the 22nd day, where it remained.—Cured.
No. 181	29 to 39	many small ones.	No effect on temperature and pulse.
Vol. 126	39	3 oz.	" " " " " " On 40th day temperature rose from 100° to 104°. Pulse rose from 112 to 130. The temperature remained between 102° and 103° until death on the 51st day. 47th day R. B. C. 1,850,000. Hbn. 32%. 49th day W. B. C. 21,000.—Death on 51st day.
No. 15	12	½ dram	Temperature fell from 103.2° to 101.8°. Pulse no change.
Vol. 127			Temperature fell to normal on the 15th day.—Cured.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 67 Vol. 127	11	½ oz.	No change in the temperature and pulse. Temperature fell to normal on the 30th day.—Cured.
No. 82 Vol. 127	30	1 oz.	No effect on temperature and pulse.
	31	½ oz.	" " " " " " Relapse beginning on the 40th day.
	48	1½ oz.	No effect on temperature and pulse. Temperature normal on the 68th day.—Cured.
No. 148 Vol. 128	22	10 oz.	Temperature rose from 102.8° to 103.8°.
		3 oz.	Pulse fell from 108 to 94.
	23	12 oz.	No effect on temperature and pulse.
		8 oz.	" " " " " " Patient died on the 27th day.
No. 160 Vol. 128	19	1 oz.	No effect on temperature and pulse. Temperature normal on the 43rd day.—Cured.
No. 179 Vol. 129			No hemorrhage in St. Luke's but before coming in, on the 22nd day, patient had four large stools of blood, and on the 23rd day 2 stools of blood. Died on the 35th day; complication, pneumonia.
No. 124 Vol. 129			Temperature normal on the 16th day. Relapse began on the 24th day.
	24	? oz.	Temperature rose from 101.6° to 102.8°. No change in pulse.
	26	4 oz.	Temperature fell from 102.6° to 101°. Pulse fell from 140 to 120. Temperature normal on the 36th day.—Cured.
No. 125 Vol. 129			Relapse beginning on the 47th day.
	57	1 oz.	Temperature fell from 104.6° to 102.2°.
		45-50 oz.	Pulse from 140 to 120. R. B. C. 2,500,000. Hbn. 55%.
	58	6 oz.	No effect on temperature and pulse.
		5 oz.	Temperature fell from 103.2° to 101°. Pulse fell from 120 to 116.
		2 oz.	No effect on temperature and pulse. Temperature normal on the 64th day. Then followed another relapse, temperature reaching normal again on the 116th day. R. B. C. 4,912,000. Hbn. 80%.—Cured.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 8 Vol. 130	33	1 dram	Temperature rose from 99.6° to 102.4°. No change in pulse. Temperature normal on the 39th day, then irregular, possibly due to gall bladder complication, until it fell to normal on the 60th day.—Cured.
No. 36 Vol. 130	32	½ oz.	No effect on temperature and pulse.
	33	1 oz.	Temperature fell from 101.8° to 97.2°. Pulse fell from 118 to 104.
	35	½ oz.	Temperature fell from 102.6° to 101°. Pulse fell from 120 to 100. Temperature reached normal on the 47th day. Cured.
			1906.
No. 14 Vol. 119	17	2 drams	No effect on temperature and pulse. Three brothers also had typhoid, one light case and two with bad hemorrhages. Patient died on the 22nd day.
No. 47	8	1 dram	Temperature unaffected. Pulse rose from 116 to 130.
Vol. 119	9	5 oz.	No effect on temperature and pulse.
	10	3 oz.	No effect on the temperature, pulse fell from 120 to 92.
		2 oz.	No effect on temperature and pulse.
		2 oz.	" " " " " "
	11	2 oz.	" " " " " "
	12	2 oz.	Temperature fell from 104° to 102.6°. No effect on the pulse.
	13	3 oz.	Temperature fell from 102.6° to 101.6°. Pulse fell from 110 to 88. Temperature normal on the 20th day.—Cured.
No. 8 Vol. 120	15	6 drams	No effect on temperature and pulse.
		2 drams	" " " " " " Temperature normal on the 30th day.—Cured.
No. 177 Vol. 120	20	8 oz.	No effect on temperature and pulse.
	21	5 oz.	" " " " " "
	23	3 oz.	" " " " " "
	24	3 oz.	" " " " " " Temperature normal on the 53rd day.—Cured.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 69			
Vol. 121	11	10 oz.	Temperature fell from 104° to 98.6°. Pulse fell from 120 to 98.
	12	5 oz.	No effect on temperature and pulse.
		6 oz.	" " " " " "
		4 oz.	" " " " " "
	13	4 oz.	" " " " " "
	14	40 oz.	Temperature fell from 103.6° to 99.2°. Pulse fell from 128 to 104.
		4 oz.	
		3 oz.	
	15	6 oz.	Temperature rose from 99.2° to 101.4°. Pulse unchanged.
	20	3 oz.	No effect on temperature. Pulse fell from 116 to 106.
	22	4 oz.	No effect on temperature and pulse. Temperature normal on the 50th day.—Cured.
No. 70			
Vol. 123	23	2 drams	No effect on temperature and pulse
		2 drams	
	24	2 drams	Patient died on the 31st day from perforation.
No. 97			
Vol. 123	23	2 oz.	No effect on temperature and pulse. Patient died on the 27th day.
No. 142			
Vol. 123	27	4 oz.	No effect on temperature and pulse.
	28	8 oz.	" " " " " "
		4 oz.	" " " " " "
	29	10 oz.	Temperature fell from 102.8° to 101°. Pulse fell from 124 to 118. Patient died on the 35th day.
No. 181			
Vol. 123	9	2 oz.	Temperature fell from 103.8° to 101.4°. Pulse rose from 100 to 160, then fell to 100.
		2 oz.	
		16 oz.	
		8 oz.	
	11	10 oz.	No change in temperature. Pulse fell from 130 to 84.
		2 oz.	Temperature rose from 103° to 104.6°. Pulse rose from 120 to 160.
		4 oz.	No effect on temperature and pulse. Patient died on the 17th day.
No. 224			
Vol. 123	27	8 oz.	No effect on temperature. Pulse fell from 146 to 120. Patient died on the 27th day.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 105 Vol. 124	18	5 oz. 5 oz. 8 oz. 8 oz.	No effect on temperature and pulse. Temperature normal on the 41st day.—Cured.
No. 117 Vol. 124	19	6 oz.	No effect on temperature and pulse. Temperature normal on the 44th day.—Cured.
No. 133 Vol. 124	8	10 oz.	No effect on temperature and pulse. Temperature normal on the 28th day. Relapse beginning on the 47th day, temperature normal again on the 60th day.—Cured.
No. 137 Vol. 124	20	6 oz.	No effect on temperature. Pulse rose from 104 to 126.
	28	6 oz.	No effect on temperature and pulse.
	30	4 oz.	Temperature unaffected. Pulse rose from 100 to 120.
		4 oz.	Temperature unaffected. Pulse rose from 100 to 120. Temperature normal on the 38th day.—Cured.
No. 147 Vol. 124	19	4 oz.	No effect on temperature and pulse.
	20	4 oz.	" " " " " " Temperature normal on the 45th day.—Cured.
			1905.
No. 58 Vol. 107	24	3 oz. 1 oz.	Temperature rose from 101.6° to 103.2°. Pulse unchanged. Temperature normal on the 38th day, relapse beginning on the 40th day. Temperature normal again on the 63rd day.—Cured.
No. 61 Vol. 113	14	8 oz.?	
	16	1 oz.?	
	17	½ oz.?	
	18	½ oz.?	No effect on temperature and pulse.
		½ oz.?	
	19	½ oz.?	Temperature normal on the 45th day.—Cured.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 40 Vol. 115			Temperature reached normal on the 21st day, then gradually rose again.
	25	12 oz.	Temperature fell from 103° to 100°.
		4 oz.	Pulse rose from 90 to 100.
	26	1 oz.	Temperature unaffected. Pulse rose from 88 to 98.
	27	18 oz.	No effect on temperature and pulse. Temperature normal on the 32nd day.—Cured.
No. 50 Vol. 115	11	2 oz.	No effect on temperature and pulse.
	12	8 oz.	Temperature unaffected. Pulse rose from 92 to 104. Temperature normal on the 42nd day. Relapse beginning on the 50th day. Temperature normal again on the 70th day.—Cured.
No. 55 Vol. 115	24	1 oz.	No effect on temperature and pulse.
		20 oz.	" " " " " "
	25	2 oz.	Temperature unaffected. Pulse rose from 98 to 116.
		4 oz.	No effect on temperature and pulse.
		2 oz.	
		7 oz.	
		8 oz.	
	26	5 oz.	Temperature and pulse not taken, patient perforated and died at this point.
		6 oz.	
No. 2 Vol. 116	14	8 oz.	No effect on temperature.
		9 oz.	
		4 oz.	
		3 oz.	
	15	10 oz.	Pulse varying between 100 and 120.
		3 oz.	
		7 oz.	
		6 oz.	Temperature fell from 103° to 101°.
		2 oz.	Temperature rose from 101° to 104.4°. Pulse between 112 and 120.
		2 oz.	
		2 oz.	
	17	2 oz.	Temperature rose from 102.6° to 105°. Pulse unchanged.
	19	15 oz.	No effect on temperature and pulse. Temperature always very irregular, normal on the 49th day.—Cured.
No. 49 Vol. 116	34	3 oz.	Temperature fell from 102° to 101°. Pulse rose from 104 to 112.
	36	½ oz.	No effect on temperature and pulse. Temperature normal on the 43rd day.—Cured.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 3 Vol. 117	21	3 oz.	No effect on temperature and pulse.
		3 oz.	Temperature rose from 101.2° to 103.2°. Pulse unchanged.
	22	2 oz.	Temperature fell from 101.8° to 98.8°. Pulse unchanged.
		2 oz.	Temperature fell from 102° to 100.4°. Pulse unchanged.
	39	10 oz.	No effect on temperature and pulse. Temperature normal on the 67th day. Relapse beginning on the 73rd day. Temperature normal again on the 87th day.—Cured.
No. 32 Vol. 117	10	½ oz.	Temperature unchanged. Pulse fell from 128 to 116.
	14	30 oz. (10 small hemorrhages)	Temperature fell from 104.2° to 101.2° in 24 hours. Pulse unchanged.
	15	7 oz.	No change in temperature and pulse. Temperature normal on the 72nd day.—Cured.
No. 1 Vol. 118	14	1 oz.	No effect on temperature and pulse.
		½ oz.	Temperature fell from 103.2° to 102°. Pulse unchanged.
	24	7 oz.	No effect on temperature and pulse. Temperature normal on the 41st day.—Cured.
No. 17 Vol. 118	28	1 oz.	Temperature fell in 24 hours from 105.4° to 97.2° Pulse fell from 156 to 120. Patient died on the 29th day, no further hemorrhage.
No. 23 Vol. 118	20	14 oz. 5 oz. ? oz.	Temperature unchanged. Pulse rose from 132 to 168.
	22	10 oz. ? oz. 10 oz.	Temperature fell from 103.6° to 101.6°. Pulse became irregular. Patient died on the 22nd day.
			1904.
No. 27 Vol. 95	7	20 oz.	No change in temperature. Pulse rose from 98 to 110.
	8	7 oz.	Temperature rose from 102° to 104.4°. Pulse unchanged. Patient died on the 10th day.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 84 Vol. 96	15	2 drams ½ oz. 1 dram ½ oz.	No change in temperature and pulse.
	33	½ oz.	No change in temperature and pulse. Temperature normal on the 49th day.—Cured.
No. 3 Vol. 101	14	1 oz.	No effect on temperature and pulse.
	15	1 dram	" " " " " "
	16	5 oz.	Temperature unchanged. Pulse rose from 90 to 100.
		½ oz.	No change in temperature and pulse.
	17	4 oz.	Temperature fell from 101.4° to 100.2°. Pulse fell from 100 to 80.
		4 oz.	Temperature fell from 102.2° to 101°. Pulse unchanged. Temperature normal on the 32nd day.—Cured.
No. 29 Vol. 102	17	2 oz.	Temperature unchanged. Pulse rose from 96 to 104.
	19	1 oz. 20 oz. 10 oz.	Temperature fell from 102.6° to 101.4°. Pulse rose from 96 to 112. Temperature normal on the 31st day.—Cured.
No. 44 Vol. 102	26	1 oz.	Temperature unchanged. Pulse rose from 144 to 160.
	27	1 oz. 40 oz. 15 oz. 3 oz. 12 oz. 25 oz.	Temperature rose from 104° to 105.8°. Pulse rose to 180 and then became imperceptible. Patient died on the 27th day.
No. 16 Vol. 103	20	2 oz.	No effect on temperature and pulse. Temperature normal on the 41st day.—Cured.
No. 22 Vol. 103	50	1 oz.	No effect on temperature and pulse. Temperature normal on the 63rd day.—Cured.
No. 28 Vol. 105	16	3 oz. 2 oz.	No effect on temperature and pulse.
	18	8 oz. 12 oz. 20 oz.	No effect on temperature. Pulse rose from 86 to 104. Temperature normal on the 29th day.—Cured.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 65 Vol. 105	29	1 oz.	Temperature rose from 102.8° to 103.6°. Pulse fell from 132 to 120.
	31	3 oz. 4 oz. 10 oz.	Temperature fell from 103° to 98°, next day rose to 104°. Pulse rose from 120 to 136, then fell to 112. Temperature normal on the 51st day.—Cured.
No. 23 Vol. 106	13	½ oz.	Temperature rose from 99° to 100.4°. Pulse unchanged. On the 14th day patient perforated and died.
			1903.
No. 146 Vol. 89	13	4 oz.	Temperature unchanged. Pulse rose from 84 to 100.
	14	4 oz.	Temperature rose from 100.6° to 102.8°. Pulse unchanged.
	15	5 oz. 4 oz.	No effect on temperature and pulse.
	16	2 oz.	" " " " " "
	17	5 oz.	" " " " " "
	20	10 oz.	" " " " " " Temperature normal on the 27th day. Relapse beginning on the 34th day, normal again on the 56th day.—Cured.
No. 16 Vol. 90	18	4 oz. 3 oz.	No effect on temperature and pulse. Temperature normal on the 30th day. Relapse beginning on the 32nd day, normal again on the 56th day.—Cured.
No. 133 Vol. 90	40	8 oz.	No change in temperature and pulse. Patient died on the same day.
No. 63 Vol. 93	24	1 dram	No effect on temperature and pulse.
	27	6 oz.	" " " " " "
	28	8 oz.	" " " " " "
	32	2 oz.	" " " " " " Patient died on the 42nd day from pneumonia.
No. 67 Vol. 93	12	3 oz.	Temperature unchanged. Pulse rose from 100 to 112.
	14	15 oz. 8 oz. 16 oz.	No effect on temperature. Pulse rose from 110 to 136. Patient perforated and died on the 18th day.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 28 Vol. 94	17	2 oz.	Temperature rose from 102.2° to 104.2°. Pulse rose from 100 to 112.
	18	2 oz. 5 oz.	Temperature unchanged. Pulse rose from 112 to 128. Temperature did not reach normal until the 76th day, possibly because of a complicating bed-sore.—Cured.
No. 57 Vol. 94	14	3 oz.	Temperature unchanged. Pulse rose from 100 to 118.
	19	12 oz.	Temperature unchanged. Pulse rose from 110 to 144.
	20	11 oz.	Temperature rose from 103° to 104.4°. Pulse unchanged.
	21	8 oz. 8 oz. 8 oz.	Temperature unchanged. Pulse rose from 144 to 158.
	22	8 oz. 6 oz. 8 oz.	Temperature unchanged. Pulse became imperceptible. Patient died on the 22nd day.
No. 20 Vol. 94A	19	1 oz.	Temperature fell from 105° to 102°. Pulse unchanged.
	23	2 oz.	No change in temperature and pulse.
	39	2 drams	Temperature rose from 103.6° to 104.2°. Pulse rose from 128 to 138.
		2 drams	No change in temperature and pulse.
	40	1 dram	" " " " " "
		1 dram	" " " " " "
	41	1 dram	Temperature fell from 103° to 101°. Pulse unchanged.
		½ dram	No change in temperature and pulse.
	43	4 drams 13 oz. 6 oz. 12 oz. 6 oz.	Following these hemorrhages temperature fell from 103.8° to 97.8°. Pulse rose from 130 to 158.
	44	10 oz. 5 oz. 1 oz. 3 oz. 3 oz. 4 oz.	Temperature varied between 100.8° and 98° Pulse not counted.
	45	4 oz.	No effect on temperature and pulse. Patient died on the 45th day.

1903.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 29			
Vol. 94A	9	3 drams	Temperature unaffected. Pulse rose from 112 to 132.
	10	½ dram	Temperature fell from 104.6° to 103°. Pulse no change.
		½ dram	No effect on temperature and pulse.
	11	2 drams	" " " " " "
		1 dram	" " " " " "
	13	1 dram	Temperature fell from 102.6° to 99.6°, then rose to 102.8°. Pulse rose from 128 to 136.
		4 oz.	
		8 oz.	
		3 oz.	
	27	6 oz.	No effect on temperature and pulse.
	28	1 oz.	" " " " " "
			Temperature normal on the 40th day.—Cured.
No. 61			
Vol. 94A	19	1 dram	Temperature unaffected. Pulse rose from 102 to 114.
	23	6 oz.	No effect on temperature and pulse.
	24	2 oz.	" " " " " "
	25	3 oz.	" " " " " "
	26	2 oz.	Temperature unaffected. Pulse rose from 128 to 140.
		3 oz.	
		2½ oz.	
	27	3 oz.	No effect on temperature and pulse.
	28	3 oz.	" " " " " "
		2 oz.	" " " " " "
	29	2 oz.	" " " " " "
	30	3 oz.	" " " " " "
	32	2 oz.	" " " " " "
			On the 34th day the temperature rose from 101° to 107.6° and the patient died.
No. 27			
Vol. 94B	27	½ oz.	No effect on temperature and pulse.
	28	½ oz.	Temperature fell from 104.8° to 102°. Pulse rose from 84 to 104. Temperature normal on the 57th day.—Cured.
No. 38			
Vol. 94B	18	4 oz.	Temperature unaffected. Pulse rose from 86 to 96. Temperature normal on the 32nd day.—Cured.
No. 48			
Vol. 94B	15	? oz.	No effect on temperature and pulse.
		? oz.	
		? oz.	
		20 oz.	
			Patient died on the 25th day.

1902.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 111 Vol. 83	30	10 oz.	No change in temperature and pulse.
	32	7 oz. 7 oz.	Temperature fell from 102° to 99.4°, then rose to 102.6°. Pulse unchanged.
			Temperature normal on the 43rd day.—Cured.
No. 151 Vol. 83	11	1 oz.	No change in temperature and pulse.
	12	½ oz. ½ oz. 11 oz. 14 oz.	No change in temperature. Pulse rose from 104 to 128.
	13	11 oz. 7 oz.	Temperature fell from 104° to 102.4°. Pulse fell from 128 to 118.
	14	1 oz. 8 oz. 12 oz.	No change in temperature. Pulse rose from 120 to 128.
	15	8 oz.	No change in temperature and pulse.
	16	4 oz.	" " " " " " Patient died on the 21st day. Complications, tuberculosis, colitis, pneumonia.
No. 55 Vol. 84	17	6 oz. 30 oz. 40 oz.	Temperature rose from 100.6° to 104.4°. Pulse rose from 92 to 108.
	21	1 oz.	No change in temperature and pulse. Temperature normal on the 32nd day.—Cured.
No. 65 Vol. 84	?	7 oz.	Temperature fell from 102.8° to 101.6°. Pulse unchanged.
	?	12 oz.	Temperature rose to 106.4°. Pulse rose from 118 to 130. Patient died on the same day (day after admission).
No. 53 Vol. 87	8	4 oz.	No effect on temperature and pulse.
	9	2 oz.	" " " " " " On the 18th day the patient perforated and was transferred to the surgical division.
No. 72 Vol. 87	18	1 oz.	No effect on temperature and pulse. Relapse beginning on the 30th day.
	38	2 oz. 5 oz.	Temperature rose from 100° to 102.6°, then fell to 101°. Pulse rose from 120 to 140.
	39	5 oz.	Temperature fell from 103.6° to 98.2°. Pulse rose from 128 to 170, then became irregular.
			Patient died on the 40th day.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 112 Vol. 87	13	6 oz.	No effect on temperature and pulse. Temperature normal on the 27th day.—Cured.
No. 115 Vol. 87	9	6 oz.	Temperature rose from 102° to 103.6°. Pulse rose from 110 to 128.
		2 oz.	Temperature unaffected. Pulse rose from 108 to 136.
	10	2 oz.	No effect on temperature.
		3 oz.	
		8 oz.	
		6 oz.	Pulse ranging between 140 and 150.
		5 oz.	
	12	5 oz.	No effect on temperature and pulse.
	13	2 oz.	No effect on temperature.
		10 oz.	Pulse ranging between 140 to 164.
	14	2 oz.	Temperature rose from 102.5° to 104.4°. Pulse rose from 150 to 160. Patient died on the 16th day.
No. 2 Vol. 88	22	½ oz.	
	24	½ oz.	
	25	16 oz.	No effect on temperature and pulse.
		14 oz.	
	27	½ oz.	
			Temperature normal on the 35th day.—Cured.
No. 22 Vol. 88	16	4 oz.	No effect on temperature and pulse.
		6 oz.	
	17	3 oz.	Temperature unaffected. Pulse rose from 100 to 120.
		6 oz.	
	41	2 oz.	No effect on temperature and pulse. Temperature normal on the 44th day.—Cured.
No. 40 Vol. 88	13	6 oz.	No effect on temperature.
		12 oz.	Pulse rose from 104 to 132.
		3 oz.	
	14	5 oz.	No effect on temperature.
		5 oz.	Pulse rose from 116 to 130.
		1 oz.	
	16	5 oz.	No effect on temperature and pulse. Patient died on the 78th day. Complications, post-typhoid sepsis and subacute nephritis.
No. 104 Vol. 88	15	8 oz.	Temperature fell from 103.6° to 101.6°. Pulse rose from 106 to 120.
	17	6 oz.	Temperature unchanged. Pulse rose from 108 to 120. Temperature normal on the 40th day.—Cured.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 132 Vol. 88	13	1 oz.	
		10 oz.	
		10 oz.	Temperature fell from 103.6° to 101.6°, then rose to 104.8°.
		14 oz.	
		12 oz.	Pulse rose from 88 to 104.
		8 oz.	
		10 oz.	
	15	3 oz.	
		10 oz.	
		10 oz.	Temperature fell from 104.6° to 101.8°.
		20 oz.	Pulse rose from 104 to 128.
		10 oz.	
		20 oz.	
			Patient died on the 15th day.
			1901.
No. 67 Vol. 80	12	4 oz.	Temperature fell from 103.8° to 102.4°. Pulse fell from 106 to 84.
	13	8 oz.	Temperature rose from 102.6° to 105°, then fell to 103.6°.
		10 oz.	
		4 oz.	Pulse stayed between 96 and 92.
		2 oz.	
	14	4 oz.	No effect on temperature and pulse.
	15	4 oz.	Temperature fell from 104° to 102°. Pulse fell from 106 to 90.
		1 oz.	Temperature rose from 102° to 103.5°. Pulse unchanged.
	16	8 oz.	
		4 oz.	
		3 oz.	
		4 oz.	
		8 oz.	Temperature rose to 105.2°, then (with 5 grains of ammonal) fell to 100.2°.
		3 oz.	Pulse rose from 84 to 108, then fell to 98.
		3 oz.	
		3 oz.	
		5 oz.	
		2 oz.	
	17	1 oz.	Temperature rose from 101.6° to 104.6°.
		5 oz.	Pulse fell from 108 to 100.
			Temperature normal on the 33rd day.—Cured.
No. 144 Vol. 80	15	3 oz.	Temperature rose from 101.8° to 105.2°.
		1 oz.	Pulse rose from 108 to 128.
			Patient perforated on the 15th day and died.
No. 2 Vol. 81	23	6 oz.	Temperature unaffected. Pulse rose from 94 to 108.
	29	2 oz.	No effect on temperature and pulse.
	34	5 oz.	Temperature rose from 102.6° to 105.6°, then fell to 104.2°. Pulse rose from 128 to 160.
		8 oz.	
			Patient died on the 34th day.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 16 Vol. 81	19	10 oz.	No effect on temperature. Pulse rose from 118 to 138.
		2 oz.	
		10 oz.	
	20	? oz.	Temperature rose from 101° to 104.2°. Pulse unchanged.
		10 oz.	
		? oz.	
			Patient died on the 24th day.
No. 57 Vol. 80	16	? oz.	No effect on temperature and pulse.
	19	? oz.	
		? oz.	
	20	? oz.	
	22	4 oz.	
			Temperature normal on the 37th day.—Improved.
No. 67 Vol. 81	20?	22 oz.	Temperature fell from 101.8° to 97.8°. Pulse rose to 120 and then became imperceptible.
		20 oz.	
			Patient died on the 20th day.
			Illness occurred after an attack of rheumatism with multiple boils.
No. 107 Vol. 81	19	2 oz.	No change in temperature and pulse.
	20	½ oz.	
	24	1 oz.	Temperature fell from 100.4° to 99°. No effect on pulse.
	49	1½ oz.	Temperature fell from 99° to 97°. Pulse rose to 120.
		½ oz.	
			Temperature had been practically normal since the 20th day.—Cured.
No. 112 Vol. 81	13	? oz.	No effect on temperature and pulse. Two relapses. Temperature normal on the 64th day.—Cured.
No. 13 Vol. 82	36	2 oz.	Temperature rose from 100.6° to 103°. Pulse unchanged.
	37	½ oz.	No change in temperature and pulse.
		2 oz.	
	38	3 oz.	Temperature rose from 101° to 103.2°. Pulse unchanged.
		3 oz.	No effect on temperature and pulse. Temperature normal on the 51st day.—Cured.
No. 64 Vol. 82	14	5 oz.	No effect on temperature and pulse. Temperature normal on the 36th day.—Cured.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 104			
Vol. 82	10	4 oz.	No effect on temperature and pulse.
	11	3 oz.	
	12	5 oz.	
	14	5 oz.	
		10 oz.	Temperature unaffected. Pulse fell from 100 to 82.
	15	3 oz.	No effect on temperature and pulse. Temperature normal on the 29th day.—Cured.
No. 128			
Vol. 82	17	2 oz.	No effect on temperature. Pulse fell from 104 to 68.
		9 oz.	
		16 oz.	
			1900.
No. 10			
Vol. 68	19?	6 oz.	Temperature fell from 103.4° to 98.6°. Pulse unchanged.
		8 oz.	
	20?	12 oz.	Temperature rose from 98.6° to 103.8°.
		3 oz.	Pulse rose from 112 to 148.
	21?	7 oz.	No change in temperature (104°). Pulse rose from 140 to 148.
	22	6 oz.	Temperature fell from 103° to 101°. Pulse rose from 120 to 138. Patient died on the 22nd day.
No. 15			
Vol. 68	22	3 oz.	No effect on temperature and pulse.
	25	4 oz.	Temperature rose from 101.6° to 102.8°. Pulse unchanged.
	35	48 oz.	No change in temperature and pulse. (On the 35th day temperature was below 100.2° all day, had been gradually falling.) Temperature normal on the 38th day.—Cured.
No. 17			
Vol. 68			Temperature normal on the 30th day. Relapse beginning on the 37th day.
	47	5 oz.	No effect on temperature and pulse. Died on the 48th day.
No. 25			
Vol. 73	21	4 oz.	Temperature fell from 104° to 102.8°. Pulse unchanged. Temperature normal on the 38th day. Relapse beginning on the 46th day. Temperature normal again on the 60th day.—Cured.
No. 28			
Vol. 73	8?	3 oz.	No effect on temperature and pulse.
		2 oz.	
			On the 10th (?) day patient perforated and died.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 97 Vol. 74	23	6 oz. 20 oz. 10 oz.	Temperature rose from 103° to 104.6°. Pulse rose from 128 to 148. Patient died on the 23rd day.
No. 135 Vol. 74	26	6 oz. 20 oz.	No effect on temperature. Pulse rose from 160 to 180. Patient perforated and died on the 26th day.
No. 46 Vol. 75	26	16 oz. 2 oz. 4 oz. 4 oz. 6 oz.	Temperature fell from 106.2° to 101.4°, then rose to 106.2° again. Pulse rose from 100 to 132.
	27	6 oz.	Patient died on the 29th day.
			1900.
No. 60 Vol. 75	22	2 oz.	Temperature rose from 102.8° to 103.8°. Pulse rose from 122 to 146.
	25	1 oz.	Temperature rose from 103° to 104.2°. Pulse unchanged.
	32	2 drams	Temperature rose from 104° to 106.4° (with a chill). Pulse rose from 114 to 130.
	35	1 dram	No effect on temperature and pulse.
	39	2 drams 3 drams	Temperature fell from 102° to 100.6°. Pulse unchanged.
	51	2 drams	No effect on temperature and pulse. Temperature normal on the 66th day.—Cured.
No. 77 Vol.75	13	1 oz.	No effect on temperature and pulse. Temperature normal on the 22nd day.—Cured.
No. 93 Vol. 75	26	2 drams 2 drams	No effect on temperature and pulse. Temperature normal on the 73rd day (case complicated by many abscesses.)—Cured.
No. 103 Vol. 76	29	6 oz.	Temperature rose from 101.6° to 102.6°. Pulse rose from 104 to 112.
	30	14 oz.	Temperature rose from 100.8° to 106.4°. Pulse unchanged.
	31	20 oz. 3 oz. 2 oz.	Temperature fell from 106.4° to 98.6°, then rose to 101.8°. Pulse rose from 120 to 142, then fell to 114. Patient died on the 47th day.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 128 Vol. 76	26	6 oz. 10 oz.	Temperature rose from 102.4° to 103.8°. Pulse unchanged.
	27	18 oz. 12 oz.	Temperature fell from 104.4° to 100.4°. Pulse rose from 100 to 122. Temperature normal on the 39th day.—Cured.
No. 149 Vol. 76	8	15 oz. 2 oz.	No effect on temperature and pulse.
	13	20 oz. 20 oz.	Temperature fell from 102.8° to 98.6°, then rose to 103°. Pulse rose from 80 to 100. Temperature normal on the 20th day.—Cured.
			1899.
No. 165 Vol. 66	18	6 oz. 3 oz. 8 oz.	Temperature fell from 105° to 102.6°. No change in pulse. Temperature normal on the 57th day.—Cured.
No. 3 Vol. 67	23	4 oz. 4 oz. 6 oz.	Temperature fell from 106° to 101.2°, then rose to 103.8°. Pulse rose from 94 to 118, then fell to 92.
	24	6 oz. 6 oz. 1 oz. 15 oz.	Temperature fell from 103.8° to 100.6°, then rose to 104°, then fell to 101°. Pulse varied between 92 and 100.
	25	8 oz.	No effect on temperature and pulse. Temperature normal on the 49th day.—Cured.
No. 74 Vol. 67	24	1 oz. 1 oz. 8 oz. 2 oz.	Temperature fell from 104° to 101.4°. Pulse rose from 108 to 140.
	25	6 oz. 4 oz. 2 oz. ½ oz.	Temperature rose from 101° to 104°. Pulse rose from 120 to 136.
	27	16 oz.	No effect on temperature and pulse. Patient died on the 27th day.
			1898.
No. 65 Vol. 60			In nurses' notes mentions several bloody stools, amount and time not given. Patient died on the 29th day.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 106 Vol. 62	24	? oz. (slight)	Effect on temperature and pulse not noted.
	25	? oz. (moderate)	Effect on temperature and pulse not noted.
			Patient died on the 25th day.
No. 80 Vol. 63	14	6 oz.	No change in temperature and pulse. Patient died on the 17th day (perforation?).
No. 123 Vol. 63	19	2 oz.	No effect on temperature and pulse.
	24	1 oz.	
	25	2 oz.	
		2 oz.	Temperature rose from 102° to 106°, then fell to 102.4°. Pulse rose from 116 to 160.
	26	2 oz.	Temperature irregular, between 99.2° and 102.4°.
		8 oz. continuous	Pulse rose from 114 to 130. Patient bleeding from the gums. Died on the 26th day.
No. 128 Vol. 63	17?	? oz.	Temperature and pulse not noted. Temperature normal on the 34th day.—Cured.
No. 190 Vol. 63	14? 15? 16?	several almost continuous	Effect on temperature and pulse not noted. Patient died on the 16th (?) day.
No. 194 Vol. 63			Date not definite, patient probably having relapse.
	12?	6 oz.	No effect on temperature and pulse.
	18	1 oz.	
		2 oz.	Temperature normal on the 25th day (of relapse).—Cured.
No. 198 Vol. 63	10	6 oz.	No effect on temperature and pulse.
		1 oz.	Temperature normal on the 19th day.—Cured.
No. 200 Vol. 63	19	? oz.	No effect on temperature and pulse.
	20	4 oz.	No effect on temperature. Pulse rose from 100 to 128.
		4 oz.	Temperature normal on the 32nd day.—Cured.

HISTORY NUMBER	DAY OF DISEASE	AMOUNT OF HEMORRHAGE	EFFECT ON TEMPERATURE AND PULSE. RESULT.
No. 111 Vol. 64	19	3 oz. 4 oz. 1 oz.	Temperature rose from 102.2° to 107° (with a chill). Pulse rose from 108 to 132. Patient died on the 20th day.
No. 116 Vol. 64	16	2 oz.	No effect on temperature and pulse. Temperature rose rapidly, pulse became imperceptible and patient died on the 17th day.

YEAR	TOTAL CASES	CASES WITH HEMOR.	TOTAL DEATHS	DEATHS IN HEMOR. CASES	DEATHS IN CASES WITHOUT HEMOR.
1898	111	11	15	7	8
1899	62	3	8	1	7
1900	100	14	16	7	9
1901	87	12	11	5	6
1902	106	13	15	6	9
1903	108	13	13	7	6
1904	77	10	6	3	3
1905	89	12	6	3	3
1906	99	15	15	6	9
1907	124	15	9	4	5
Totals	963	118	114	49	65
	Percentage	%12.24	%11.84	%41.53	%7.7

FEEDING IN TYPHOID FEVER.

The following graduated series of diets has been arranged as a matter of convenience where a large number of TYPHOID FEVER patients are being treated in the Hospital wards to enable the attending physicians to know at a glance just what food and how much food value any patient is getting at any given time.

The approximate number of calories in the series has been determined and the intervals of feeding arranged to suit the needs and comfort of the patients and coincide with the routine work in the wards.

Fever No. I. is continued through the height of the illness and Fever No. II. given when the patient's appetite returns, the tongue is clean and abdominal symptoms, if present, have disappeared.

When Convalescent No. I. is allowed, it has been customary to give one-half ounce of Malt and Cod Liver Oil Emulsion three times a day, which is almost invariably well borne; and not only acts as a tonic, but adds considerably to the calorific value of the diet.

It is interesting to note that the weight of the patients—which is taken weekly throughout the entire illness—in a majority of cases begins to improve on this diet, with its comparatively low calorific value.

Convalescent No. II. is allowed, as a rule, when the patient's temperature has remained normal for from five to seven days and the patient is kept on this diet until discharged from the hospital.

As a matter of convenience and accuracy in judging how much food value a patient is getting, these tables have proved of considerable value.

FEVER DIET.

5 a. m. Milk or broth.
7 a. m. Coffee.
9 a. m. Lemonade.
11 a. m. Milk.
1 p. m. Milk.
3 p. m. Lemonade.
5 p. m. Tea and milk.
Kumyss.
Broth or beef juice.
7 p. m. Milk.
9 p. m. Milk.
11 p. m. Lemonade.

Milk is made with:—
Plain milk .....4 oz.
Lime water .....2 oz.
Lemonade is made with:—
Milk sugar .....1 oz.
Cane sugar .....1 dr.
Coffee .....4 oz.
Milk .....2 oz.
Give water freely!

MODIFIED FEVER DIET.

Fever diet with plain milk instead of milk and lime water. In addition:
7 a. m. Strained cereal.
1 p. m. Ice cream.
5 p. m. Custard or junket.

APPROXIMATE CALORIFIC VALUES.

Fever ..... 850c.
Modified fever .....1,200c.
Conv. No. 1 .....1,600c.
Conv. No. 2 .....2,300c.

CONVALESCENT No. 1.

Whole milk q. 2. h or substitute
Lemonade b. i. d. In addition:

7 a.m.
Strained cereal with sugar.
Soft boiled egg, with butter, 1 dram.
Coffee.
Zwieback.

1 p. m.
Baked potato (mashed).
Custard, junket or ice cream.
Boiled rice after second day.

5 p. m.
Milk toast.
Soft boiled egg.
Tea.

CONVALESCENT No. 2.

7 a. m.
Two eggs—soft boiled.
Strained cereal.
Dry toast—1 slice.
Coffee.

1 p. m.
Soup, 6 oz.
Mashed potato.
Boiled rice.
Creamed or broiled chicken.
Lettuce salad.
Bread and butter.
Rice or tapioca pudding.
Custard or ice cream.
Lamb chop after second day.

5 p. m.
Tea.
Two eggs and toast.
Custard.

ANEURISM OF AORTA PERFORATING INTO PULMONARY ARTERY.

Dr. Austin W. Hollis.

K. S., a Japanese, 27 years old, a butler by occupation.

Family History.—Mother died of brain trouble, probably apoplexy. Father, brother and two sisters living and well.

Past History.—He was never sick, though rather delicate. No diseases of childhood. No rheumatic or syphilitic history.

Present Illness.—Six weeks before admission to St. Luke's Hospital the patient was suddenly seized with precordial pain, dyspnœa, dizziness, and a dry, barking cough without expectoration. The pain was severe and radiated to the back, especially toward the interscapular region. He was taken to Roosevelt Hospital where, after three weeks in bed, the pains became better. He was then allowed gradually to move about the ward until he went to St. Luke's where he was put to bed and rest made absolute.

Physical examination showed a well nourished man, with pale skin and mucous membranes. The pulse was collapsing and Corrigan in type, of good force and regular.

Heart.—Apex was seen and felt as a diffuse beat, perhaps most plainly in the fifth space. Heart percussion was seven inches to the left at the apex and one and a half inches at the third rib. The right border percussed one and a half inches to the right of the sternum. Cardio-hepatic angle was acute. There was a double thrill over the base, with maximum intensity over the pulmonary region, the total area being about two inches in diameter. The heart sounds were indistinct. A blowing, systolic murmur, transmitted to the axilla, was heard at the apex, and a soft, blowing, diastolic murmur just inside the apex, and along the left border of the sternum in the third and fourth spaces. Over the pulmonary area, with maximum intensity in the second space just to the left of the sternum, there was a loud, harsh, somewhat whirring, continuous murmur, with a decided systolic and diastolic phase. It was heard somewhat to the left, both upward and downward, but was lost over the right side of sternum and at the nipple on the left side. The second sound was well marked over the base.

Lungs.—At each base, though more marked at the left, there were signs of fluid.

Liver.—Edge was felt one inch below free border.

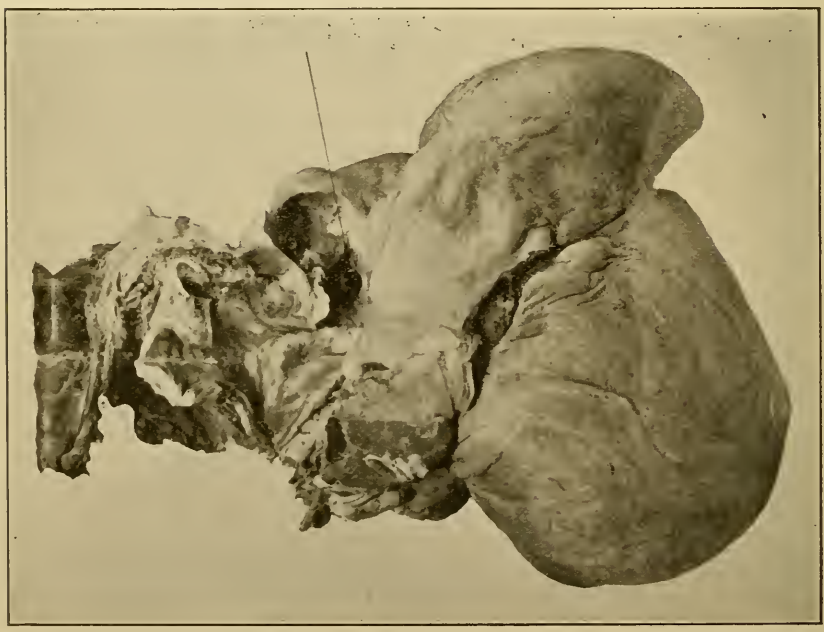
Abdomen was negative. There was no œdema of extremities.

The patient was admitted July 27th and died October 12th, 1908. His temperature was practically always normal. The pulse ranged between 100 and 120 and was always regular, but quick and collapsing. The respirations were between 20 and 30 and were generally labored with very apparent dyspnœa. Urine always contained some albumen,from a trace to 15 per cent., with hyaline and granular casts.

About the middle of August the patient developed general dropsy, with fluid in the peritoneal as well as the pleuritic cavities. The dyspnœa became more distressing, while precordial pain or distresss was always complained of. At times this was very sharp and for this he had to have regular and increasing doses of morphine. The pulse tracings were of Corrigan type. On October 12th, in the second left space near the sternum, a small bulging, with soft walls and marked, though not massive, pulsation, was seen and felt. This developed a little every day, till, just before death, it was the size of a walnut, very soft and localized, with very little dulness, on percussion, over it.

Autopsy Notes.—Extensive anasarca. 2.000 c. c. of serum in the right chest. Persistent thymus gland 6 c. by 3 c. Left pleural cavity contained 200 c. c. of clear serum. Right lung: advanced chronic congestion. Left Lung: size normal, chronic congestion, few tubercles on surface. Bronchial lymph nodes showed few tubercular lesions. Pericardium: sac contained a little bloody fluid. Heart: there were a few epicardial nodules; muscle was brownish; left ventricle, one centimetre thick; right, 5 mm.; muscle firm; valves were normal. Possibly relative dilatation of right ventricle. Endocardium and papillary muscle normal. On inner surface of ascending portion of the aorta, at a point just at the level where the right and left cusps unite, there was a round orifice with smooth edges, two centimetres in diameter, opening into a shallow sac, which was perforated in two places, one oval 5x10 mm. in the sinus just behind the right cusp of the pulmonary artery. The other perforation was into a thin-walled sac in the loose connective tissue of the pericardium occupying the origin of the aorta and the pulmonary artery at the base of the heart. This was evidently recent. There was another small pouching taking place at the base of the left cusp of the pulmonary artery. At a lower portion of the transverse arch of the aorta there was a small pouch, two centimetres in diameter, smooth, with an opening one centimetre across. Cavities of the heart were normal in size. The whole intima of aorta showed marked atheroma in patches. Similar conditions in subclavian and internal carotid. No atheroma of pulmonary artery. Liver: surface rough, extensive chronic congestion. Kidneys not removed; cut section showed nothing abnormal.

AORTIC ANEURISMS PERFORATING INTO PULMONARY ARTERY. PULMONARY ARTERY DISPLAYED.



AORTIC ANEURISMS PERFORATING INTO PULMONARY ARTERY. ANEURISM AND AORTA DISPLAYED.

This case as a study is quite unique. It is rare, not so much because it is an aortic aneurism perforating into the pulmonary artery but because of the long history after perforation occurred, because of the age of the patient, and because of no apparent etiological factor in the production of the marked arterial degeneration found on autopsy.

The onset of the symptoms and the physical signs left nothing to be desired in establishing an early diagnosis of the condition. When the patient was first admitted at Roosevelt Hospital, in the service of Dr. John S. Thacher, the correct diagnosis was suggested by him but the age of the patient and the absence of syphilitic or marked athletic history seemed so adequately to contradict this that no one studied the case without misgivings as to its true nature. The heart appeared considerably dilated to the left and the loud systolic murmur at the apex, heard to the axilla, seemed to indicate at least a relative mitral insufficiency. The autopsy findings did not bear this idea out but living conditions cannot be duplicated after death. The Corrigan pulse and typical diastolic murmur along the left border of the sternum were undoubtedly due to aortic insufficiency but the aortic ring and valves appeared quite competent. The soft tumor which appeared in the second left space about a week before death was due to perforation into the connective tissue at the base of the heart. The cause of the arterial degeneration could not be established even by pathological examination, but, from the patient's clinical appearance and the persistence of varying amounts of albumen in the urine, it would seem as if chronic nephritis might have been a factor.

THE TREATMENT OF ACUTE INFECTIOUS DISEASES WITH LEUCOCYTE EXTRACTS (HISS).*

SAMUEL W. LAMBERT, M.D.

The promulgation of a new method of treatment in any disease carries with it in these days of therapeutic scepticism the burden of proof that there is anything in it which is worthy and which deserves to last. Such an event has recently taken place, and a new phase of the general problem of immunity has been advanced by Professor Hiss and a scheme for its therapeutic application to a whole group of diseases has been developed in his own laboratory at the College of Physicians and Surgeons. When the College of Physicians of Philadelphia asked me to present something to the section on general medicine I decided to bring to you this new method of treating acute infectious diseases by leucocyte extracts, because its clinical application has been worked out in part in the hospital services over which I have the good fortune to preside and because, though it is still in the experimental stage, I believe that a presentation of its present development, even though incomplete, will interest you. I propose to devote myself largely to the clinical aspects of my thesis and to discuss theory only so far as may be necessary to explain the method and the results obtained.

Professor Hiss approached this subject entirely from the theoretical and laboratory side, and worked out his method upon the basis of animal experimentation. The laboratory development has therefore reached a higher plane than has its application to the diseases of man. In general the method consists of the subcutaneous injection of an aqueous extract of dead leucocytes taken from rabbits. The leucocytes are secured in a bacteria free condition from the pleural cavities of the animal under the stimulus of the injection of aleuronat. These exudates are centrifugalized and washed free from serum with saline solution and then extracted with an amount of distilled water equal in bulk to the original amount of the exudate.

* First published in "American Journal of Medical Sciences," April, 1909.

The remedy used in all the cases of disease in man has been this aqueous extract of rabbit leucocytes, although a similar preparation from other animals (dog) was also used in laboratory work. In most cases the leucocyte extract was made from normal rabbits, but in a few cases the rabbits were immunized to the bacterial cause of the disease to be treated prior to the injection of the aleuronat. With this occasional exception the same remedy was applied to all the infectious diseases treated irrespective of the causative agent, for the effect of the remedy is one on the toxins of the bacteria and not on the bacteria themselves. The effect is to neutralize the toxins and to assist this action of the patients' leucocytes, which can, meanwhile, be increasingly busy in their phagocytic action. The patient is thus protected against the bacterial poisons pending his own action to destroy the bacterial cause of the disease. The fundamental nature of Professor Hiss' work from the therapeutic viewpoint is found in this one fact that a single anti-toxic animal product can influence the toxæmia of a number of bacterial causes of disease.

This new method of therapy has been tried in my wards on cases of meningitis, pneumonia, ulcerative endocarditis and malaria, and in other services on cases of chronic furunculosis, acute erysipelas and other forms of septicæmia. It has been found to influence the course of most of these diseases in a marked manner, but in varying degrees in different diseases and in different cases of the same disease. It is not a cure-all, but it offers a new help in anti-bacterial medication, which is applicable to any case prior to the establishing of an exact bacterial diagnosis. Before giving the details of the results in individual cases, I would state that this remedial method has been subjected to the severest clinical test that was possible. Those patients who presented a type of disease with evident mild infection and with symptoms indicating a good prognosis were, as a rule, not treated with these leucocyte extracts. But these injections were given in large degree to the patients who were evidently severely ill. The results are to be judged from the study of the symptomatology and the daily course of the cases fully as much as from the mortality statistics of the cases treated. In fact, the number of cases treated is as yet too small from which to draw any final conclusions whatever.

Four cases of epidemic meningitis occurred on my service while this method of treatment was in use. They have already been

included in Dr. Hiss' publication and statistics on this disease. Of these cases, three recovered and one died. In case No. 1, a girl nine years old was admitted on the second day of the disease, after a sudden onset with vomiting, chill, fever, headache, stiff neck and delirium. Temperature was 103 4/10, pulse, 160, respiration, 32. The leucocytes were 30,600, polynuclears, 88 per cent., and meningococci were present in the spinal fluid. Ten cubic centimeters of leucocyte extract was given on day of admission and thereafter each day or at two day intervals until twelve injections in all had been given. The patient improved and was discharged cured on the 49th day.

The second case, also a girl, 11 years old, was admitted on the third day of the disease, with a history of headache, vomiting, delirium and stiff neck, temperature was 101, pulse, 100, respiration, 20, leucocytes were 29,000, polynuclears, 91 per cent., meningococci were present in the spinal fluid. The case was under observation for twenty days, with gradual failure in the general condition with an irregular temperature. On the 20th day of the disease treatment was begun with an injection of 10 cubic centimeters. This injection was repeated on the 21st day and again on the 23rd day. The temperature remained normal after the second injection, and the child gradually improved and was discharged cured after 36 days of hospital care.

The third case, an infant 7 months old, was admitted with a history of ten weeks of illness with fever. Two days before admission vomiting and convulsions occurred and had been repeated. On admission the temperature was 103 6/10, pulse, 126, respiration, 40. The neck was rigid and the spinal fluid contained meningococci. The child's temperature became normal, but she continued emaciating, with extreme stiffness of neck and extremities and constant vomiting. The first injection was made on the 47th day of the disease of ten cubic centimeters, which was repeated daily, or every other day, usually in doses of five cubic centimeters until a total of 50 cubic centimeters were given. The general condition improved, the child began to take food, gained weight and was finally discharged cured on the 138th day.

The fourth case was an adult, 25 years of age, who was admitted on the second day of the disease, complaining of headache, general

pains and vomiting, temperature was 99 2/10, pulse, 92, respiration, 22. There was a general hemorrhagic eruption, patient had a rigid neck and meningococci were found in the spinal fluid. The leucocytes were 21,000, polynuclears, 93 per cent. The patient died on the 13th day of the disease in spite of daily injections of 10 cubic centimeters, and there was no evidence of improvement while taking the treatment.

The treatment was tried in one case of pnuemonia, which ended fatally and which was proved by autopsy cultures to be due to Friedlander's bacillus. The case showed a distinct increase in the number of leucocytes after each injection and some drop in the temperature curve, but the toxæmia was extreme, and there was no permanent change in the course of the disease or in the severity of the infection.

An equally severe test was that of an elderly woman, 84 years old, who developed a sudden illness with cough, fever, cyanosis and dyspnœa. On the third day there was an evident consolidation in the right upper lobe, the temperature was 103, the pulse feeble, the patient was quite cyanosed on coughing and a fatal termination seemed inevitable. Three injections of ten cubic centimeters of the extract were made on three successive days. The patient improved at once after the first, and the second was followed by a fall in the temperature to normal, where it remained, and the patient recovered. In this case no bacterial diagnosis was attempted.

Professor Hiss reported some eight cases of lobar pneumonia which were treated and all of which recovered. But there was no remarkably striking result and no change in the ordinary length of the disease.

A systematic study of a large number of cases of pneumonia has not been undertaken.

The treatment has been tried in a number of cases of a more general infection with the pneumococcus. These have included cases of cerebro-spinal meningitis and of ulcerative endocarditis of pneumococcus etiology. The cases of pneumococcus meningitis showed distinct febrile remissions after the injections, but neither of the two cases recovered nor did any evidences of a real betterment in general condition appear.

The three cases of ulcerative endocarditis which have been treated

by this method have not proved particularly amenable to the injections. Two cases were due to the pneumococcus which was recovered from the blood. In the third no living organism could be demonstrated by culture from the blood. In one case the temperature before the injection was ranging from 101 to 103. After the injection of 130 cubic centimeters of the extract in 13 doses the temperature ranged for a few days between 100 and 102 upon a slightly lower plane. At this stage of the disease the patient developed a consolidation of the left lung and died with all the evidences of cerebral embolus and paralysis of the left side of the body. In the case of negative blood culture the injections did not seem to be of any influence, either on the course of the fever curve or on the final result. The patient died of cardiac depression shortly after the treatment was given.

The third case was that of a man 47 years old, who had been ill four months with gradually increasing weakness and chills at irregular intervals during that time. He suffered from evidences of cardiac disturbance: palpitation of the heart, shortness of breath and dizzy feelings. During these four months he lost 45 pounds, had night sweats and suffered from sleeplessness. He was admitted with a temperature of 101, a pulse of 88 and respiration, 24. His leucocytes were 11,900, his polynuclears, 81 per cent. Examination of his heart showed a systolic murmur, loudest over the pulmonary area, and heard over the whole left half of the precordium. He had petechial spots on his legs and right forearm and in his conjunctiva. A blood culture gave a pneumococcus of lowered virulence, but in pure culture. The course of the disease for five days was about the same on each, the pulse ranged from 90 to 100, the temperature from 101 to 103, and the patient's condition seemed stationary. Leucocyte extracts were begun after six days of observation. These were given daily, sometimes twice daily, and once three times, from the seventh day of observation until the seventeenth. During this time his temperature would vary from 100 in the morning to 102 or 103 in the afternoon. The patient in this period received 220 cubic centimeters of extract from normal rabbits, 40 cubic centimeters of extract from rabbits immunized against the patient's own brand of pneumococcus and 18 cubic centimeters of a true anti-toxic serum from immunized rabbits. The leucocytes increased up to 13,000 and

the polynuclear cells remained about 86 per cent. His hemoglobin on admission was 65 and at the end of this time had fallen to 45 per cent. His red cells had fallen from 4,800,000 to 3,800,000. The extracts used in this case were both that from normal rabbits and later that from rabbits which had been made immune to the germ taken by culture from the patient's blood. The patient developed after this course of treatment an urticaria and treatment was suspended for three weeks. No special change was noted during this time in the patient's condition. The temperature ranged irregularly, the pulse became rather rapid, ranging from 120 to 140, the patient developed emboli in the right lung, giving rise to several small infarcts, and his condition was distinctly downhill. After being in the hospital for five weeks his leucocytes were 17,800, his polynuclears, 81 per cent., his red blood cells, 3,800,000, and his hemoglobin, 40 per cent. It cannot be said that the leucocyte extracts had modified his disease in any particular. At this point the injections were resumed and the course of the case showed some slight changes in the run of the temperature. For a short period the remissions were greater, the pulse rate was somewhat slower, and the patient seemed less ill. A second blood culture taken at this time showed the same positive cultural result as before, and the patient grew slowly worse. He developed a general petechial eruption, evidences of extensive infarctions appeared in his lungs, and he died of his toxæmia.

Of all the infectious diseases acute ulcerative endocarditis must be looked upon as the most difficult to modify by treatment. It has necessarily been considered a fatal disease and will always be considered as the supreme test of any remedy which is suggested.

The influence of leucocyte extracts on febrile disease was perhaps most markedly shown in a case of tertian malaria. The patient was an adult, 30 years of age, and was admitted with a history of having had severe chills, at first every other day, and later daily. The patient had been taking quinine irregularly for six months. A physical examination showed an enlarged spleen 1½ inches below the ribs. Her other organs appeared normal. The admission temperature was 98 4/10, but upon the afternoon of the day of admission the patient had a chill and a rise of temperture to 104, which rapidly fell until the next morning it was 97. A second chill, with

a rise of temperature to 106, followed on the second afternoon. Plasmodia of the tertian variety were present in large numbers in the blood. White blood cells counted from 5,400 to 7,000, and there was a relative lymphocytosis. Immediately following this second chill the patient received ten cubic centimeters of leucocyte extract. This was repeated twice on the day following, and once on the day after that, the patient's temperature on the third day of observation was 98 4/10 in the morning, 100 8/10 in the afternoon. On the fourth day it was 99 2/10 in the morning and 102 2/10 in the afternoon. On the fifth day it was 98 4/10 in the morning and 102 4/10 in the afternoon. On the sixth day it was 98 8/10 in the morning and 103 8/10 in the afternoon. During all this time there was no treatment, the plasmodia continued to be present in the blood on daily search in large numbers. There were no chills, and the patient felt perfectly well except for the tenderness over the points of injection. The next day she received another dose of leucocyte extract of 10 cubic centimeters. Her morning temperature was 98 4/10; her evening temperature was 100 4/10. The next day her morning temperature was 98 4/10; her evening temperature, 103. She received a sixth dose of the serum. On the next day her temperature ranged from 98 4/10 to 100 8/10. The day following, 98 4/10 in the morning and 103 in the evening. The next day was the same, 98 4/10 and 103, with plasmodia present. The day following the patient had a chill, the temperature rose to 104 4/10, and the day following this was repeated, the temperature rising in the afternoon to 104. The patient became restive under the treatment, she was given quinine, 5 grs. every four hours, and her temperature did not rise again. The interesting feature in this case is the absolute control for short periods of time of the toxic symptoms in a case of double tertian malaria by an injection of leucocyte extracts. The disease returned rapidly, however, and went on its usual course until cured by quinine. Two further cases of malaria have been treated, but the results did not tally with the above. It was not possible to check the course of the chills in either one.

The effect on typhoid fever has not been carefully tested. It is evident, however, from a few experimental injections that these leucocyte extracts alone will not modify the course of that disease,

and further experiments are necessary. The laboratory indications are favorable to the hope that some modification may develop a proper method of procedure in typhoid cases, but the characteristic polymorphonuclear leucopenia of typhoid may explain the absence of effect on the toxæmia of typhoid.

The most brilliant result of this treatment was found in the group of the pyogenic cocci. The treatment of local lesions of the skin was attended with striking results in a series of six cases of recurring boils in the course of a chronic furunculosis. The cessation of the eruption promptly in all of the six cases treated was an index of the curative effect. All six cases were infectious with the staphylococcus aureus, and two had been of several years' duration.

Two other cases of chronic acne without pustule formation showed distinct improvement in the local lesion from a short course of treatment.

Perhaps the most remarkable results were obtained in a series of cases of erysipelas. These cases will be reported by Doctor A. V. S. Lambert in the immediate future.

The following two cases show two types of effect from the leucocyte extracts. In one the treatment was begun on the tenth day in a very toxic man and was continued by injections on four out of five days. Each treatment was followed by a fall in temperature, by an improvement in the patient's comfort and by a normal fever curve after five days.

The second case came under treatment on the second day of the disease, with a temperature of 105 and a typical erysipelas of both eye regions, cheeks, forehead and one ear. The eruption had some blebs and a red, raised border. After one injection the temperature fell to normal, but the rash extended, and a second injection completed the cure.

The following case of otitis media, complicated by mastoiditis and thrombosis of the jugular vein, was treated by the leucocyte extract beginning after ten days of severe septicæmia. The patient, a woman, married, age 31, was admitted to the Manhattan Eye and Ear Hospital on November 12th suffering from otitis media; puncture of left ear drum was followed by a profuse pus discharge. There was tenderness over mastoid on admission. On November 14th simple mastoidectomy was done, and at the operation a small area

of sinus, but no dura, was exposed. November 15th patient complains of pain in right ear. Temperature, 102. Membrane bulging and was punctured, a purulent discharge followed. During the next four days the temperature began to rise, running a septic course, wavering between 105 and 101. On November 17th the face was swollen with marked redness. On November 18th edema of scalp developed on the left side. On November 21st an exploration of the sinus showed it to be collapsed and the jugular vein thrombosed. A resection of the jugular vein was done. The temperature was running a septic course between 104 and 100. Ten cubic centimeters of leucocyte extract was injected on the 22nd and the 23rd. The temperature gradually came down and did not rise above 102 on November 24th and 25th. In the evening of November 25th the temperature again rose to 104. The physician in charge omitted the treatment with the extract, thinking the case hopeless, but the patient, nevertheless, held her own for several days, and on November 28th twenty cubic centimeters of leucocyte extract were injected. A gradual improvement followed, and the temperature became normal by December 3rd, where it remained, and the patient recovered.

The theoretical basis of this method of treatment was conceived by Professor Hiss upon the following argument. Contrary to the assumption of Wright that the phagocytic power of the leucocytes depended entirely upon the opsonins in the serum, Hiss observed that the phagocytic power of the white blood corpuscles varied in normal and in infected animals independently of the opsonic contents of the serum, and in such a way that it was probable that this phagocytic power was depressed during the early stages of an infection and up to the height of its development and was increased as immunity became established and a cure resulted. Upon this basic observation as a premise, Hiss inferred that in some diseases immunity depended upon the activities of the purely cellular elements of the blood independently of the serum. It is a fact also that animals survive repeated larger doses of germs because they develop under the stimulus of repeated infections both an increasing power of serum, anti-toxins and an increasing power of phagocytosis, and, in addition, an increasing power of neutralizing toxins. He inferred that some of this increasing power to neutralize toxins was an

intracellular neutralization of the toxins set free from dead bacteria within the phagocyte cells quite independent of the anti-toxic bodies of the blood plasma, which are known as anti-toxins, agglutinins, precipitins, bacteriolysins, etc. He inferred then that there existed a kind of immune agents, which are distinct from those of the plasma and which remain in the cells for cell protection alone, and are only seldom given off into the plasma. He inferred that these intracellular neutralizing bodies acted upon the poisons liberated from the germs after these bacteria have died in the processes of phagocytic digestion. Such poisons are known as endotoxins, and Professor Hiss would name his theoretical neutralizing bodies of the leucocytes as "endoantitoxins."

On these theoretical grounds Professor Hiss has established this method of therapy, by which he hoped to aid the leucocytes in their combat with the bacteria by adding to the blood plasma the very substances which they elaborate and employ in the struggle. Professor Hiss would direct the method against those endotoxin forming micro-organisms, against which no immune sera in the ordinary sense have been found to be efficient. This theory of the existence of an immunity, due to non-diffusible endoantitoxins formed and retained within the leucocytes, must cause one to modify a semi-popular idea of the white blood cell as the warlike fighter of the animal economy and must lead to a new conception in pathological cellular biology that the leucocyte is not an altruistic cell rushing to its death for the good of the greatest number, but it is a selfish protector of its individual existence, which continues to live as an individual and as a "species" upon the broad laws of natural selection and of the survival of the fittest.

The diseases caused by infection with the various pyogenic cocci, both staphylococcus and streptococcus, are all diseases whose symptoms depend, in part at least, upon endotoxins. The same is true of typhoid fever, of epidemic meningitis and of pneumonia. The chief diseases with soluble toxins which have come under observation in man are tetanus and diphtheria, and in these only can we hope to establish a true anti-toxin serum. The attempt to form a polyvalent serum for the endotoxin diseases has also not been universally successful. And in general it has not been possible to secure a serum against the individual germ of any given case because of the

time required for the immunization of an animal. It would seem, therefore, that the theories of Professor Hiss had opened up a new field for anti-bacterial therapy, which should be searched for new applications and subjected to an extended study. Professor Hiss has used in most of his experiments leucocyte extracts from normal rabbits, but in a few cases he has endeavored to produce an immunity against the general group bacteria which he is fighting, and to use leucocyte extracts from these partially immunized rabbits. In a few cases running a chronic course also he first endeavored to immunize the animals against the germ secured by blood culture or otherwise from the patients before manufacturing the leucocyte extract from those animals. This has been attempted, for instance, in the case of ulcerative endocarditis cited above, but, as has already been shown, the endocarditis cases as might be inferred *a priori*, have been particularly resistant to both kinds of extracts.

The result of the animal experimentation which Dr. Hiss carried on showed that the leucocyte extracts from normal rabbits could protect rabbits infected with lethal infections of various bacteria. Extensive experiments have been made on staphylococcus aureus, on pneumococcus, on streptococcus, on meningococcus and on typhoid bacilli. In all cases the effect was greater the earlier the beginning of the treatment. The same leucocyte extracts from normal rabbits cured guinea pigs of infections universally fatal in control animals, so that the change in the species of the animal from that of the source of the leucocyte extract did not change the results of the experiments. So far as any inference could be drawn from the use of leucocyte extracts from immunized rabbits, it was found that this product had greater power than the extracts from normal animals. In the animals treated with leucocyte extracts it was found that the growth of bacteria was not directly inhibited by the treatment, nor was there evidence of an increased phagocytosis. The remedy, therefore, is neither bactericidal nor bacteriolitic, nor is it stimulating to the phagocytes. Its use in animals is usually followed by an increase in the polymorphonuclear leucocytes, and it seems justifiable to infer that its action has to do entirely with the neutralization of the bacterial endotoxins.

The following general conclusions would seem to be justified. That we have a new remedy representing a new point of view in

the study of immunity proving an endocellular immunity, in addition to the accepted types of serum immunity and of phagocytosis. That this remedy is applicable to obscure cases of unknown bacteriology, to cases of disease with unknown or unapproachable lesions. That the remedy influences the toxæmia of the disease and gives an opportunity to the body cells to overcome the infection by removing from them the necessity of immediately attacking the endotoxins of the bacteria. It is by no means a "cure-all." It does not cure every case and it produces no miracles. It will not remove death from the world. In application it is painful locally, but it has given no other local complication, and the urticaria, so often seen in the use of serum, has been conspicuous by its absence.

Finally, I would apologize for rushing before you with such a new and unproven theory of therapeutics, except that it would seem justifiable to make known to you that a new discovery is ready to be put on trial and to be thoroughly tested by many observers. Whatever is good in it will last, and whatever cannot stand this test of modern universal investigation cannot be worthy to endure.

ORTOPHÆDIC DIVISION

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
Congenital dislocation of the hip		1	3	1	1	6
Double congenital dislocation of hip		..	1	..	..	1
Tubercular arthritis of hip	Abscess evacuated (1)	..	2	..	..	2
Tubercular hip with abscess	Incision and drainage (1)	..	[1]1	..	..	1
Tubercular osteitis of hip	Femoral osteotomy (1)	..	8	..	..	8
Double tubercular osteitis of hip		..	1	..	..	1
Double tubercular osteitis of hip, double tubercular osteitis of knees		1	..	..	..	1
Osteoarthritis of hip and knee		..	2	..	..	2
Hypertrophic osteitis of hip (rheumatic), infection		..	1	..	..	1
Double rheumatoid arthritis of hip (atrophic)		..	1	..	..	1
Acute periarticular abscess of hip		1	..	..	..	1
Osteomyelitis of femur (tubercular)		..	1	..	..	1
Osteomyelitis of femur, pelvis and spine (tubercular)		..	1	..	..	1
Osteomyelitis of spine and hip (tubercular)		..	..	..	1	1
Ununited fracture of leg, osteomyelitis		..	1	..	..	1
Tubercular osteitis of knee	Incision (1)	..	5	..	..	5
Knock knees		1	..	1	..	2
Bowed legs, knock knees	Osteotomy (1)	1	..	..	..	1
Bowed legs	Osteotomy (1)	3	1	..	..	4
	Fracture by manipulation (1)	..	..	..	..	
Tubercular osteitis of ankle		..	2	..	..	2
Talipes equino varus (poliomyelitis anterior)	Arthrodesis and transplantation of tendon (1)	1	3	..	..	4
	Arthrodesis of ankle, transplanting muscles at knee and ankle (1)					
Double congenital talipes equino varus		[2]1	..	..	..	1
Talipes equino valgus (poliomyelitis anterior)	Tenotomies (1)	..	1	..	..	1
Osteitis of spine		1	..	..	..	1
Tubercular osteitis of spine		..	6	..	..	6
Tubercular osteitis of spine, paraplegia		..	1	..	..	1
Tubercular osteitis of spine and mastoid		..	1	..	..	1

1 Left against advice.
2 And improved.

ORTOPHÆDIC DIVISION

CONDITION.	OPERATION.	Cured	Improved	Unimproved	Died	TOTAL
Tubercular osteitis of spine, mastoiditis, tubercular glands of neck		..	1	..	..	1
Tubercular osteitis of spine, acquired dislocation of hip		..	1	..	..	1
Tubercular osteitis of spine, gonorrheal vaginitis		..	1	..	..	1
Tubercular osteitis of spine, psoas abscess		..	1	..	..	1
Cerebral hemorrhage, spastic paraplegia	Tenorrhaphy (1)	..	1	..	..	1
Cerebral hemorrhage, spastic diplegia.	Tenotomies (1)	..	1	..	..	1
Cerebral lesion, spastic diplegia	Myotomies (1)	..	1	..	..	1
Progressive muscular dystrophy		..	..	1	[1]1	2
Chondrodystrophy, talipes equino varus		..	1	..	..	1
Tubercular bursitis		1	..	..	..	1
Rheumatoid arthritis (universal, atrophic)		..	2	..	..	2
Hæmophilia		..	1	..	..	1
Operations .....13 Died 0	Totals	12	54	3	3	72

1 Pneumonia.

CASES OF TRANSPLANTATION OF THE FLEXOR MUSCLES OF THE KNEE TO INCREASE THE POWER OF THE EXTENSOR MUSCLES, WITH REMARKS ON THE INDICATIONS FOR THIS OPERATION.

Infantile paralysis affects in the vast majority of cases the lower extremities, whether it also involves the upper limbs and spinal muscles or not. The feet and legs, and only a little less frequently the thighs are left, usually, permanently disabled to some extent.

It is remarkable how much disability the paralysis of a single muscle or a single group of muscles may produce, and how difficult it may be to prevent the occurrence of a deformity from this loss of normal balance.

On the other hand, it is more remarkable how well some of these children can walk though many of the muscles are weakened. For instance, paralysis of the anterior tibial muscle alone will produce a very intractable valgus deformity with dropping of the toes; or paralysis of the peroneal group will result in equino-varus of marked degree. The appearance of the foot in each case is equally deformed, but its function is very differently affected, mainly owing to the influence of the force of gravity when weight is borne. The valgus creates a very weak foot, which soon becomes flat and, perhaps, painful, while, on the other hand, weight-bearing may be made to even improve the varus, and this foot may, with comparative ease, usually be kept a useful support.

Again, an almost completely paralyzed foot will often give good support if the power at the knee is maintained, simply by stiffening the sides of the shoe a little.

If the power of the foot and its position is good, the knee will often be useful though its own power is greatly impaired.

The posterior ligaments of the knee are so powerful that they almost always are able to withstand the strain backward on the joint in walking without the assistance of the posterior muscles. On the other hand, muscular power alone must prevent flexion of the knee:

usually this is exerted by the extensor muscles, especially the quadriceps, but there are cases in which this power is lost, but the knee is kept from flexing when weight is borne by the action of the posterior muscles, and it is effected in this way: the foot being fixed upon the ground, the upper part of the tibia is pulled backward firmly by the hamstring muscles, and the ligaments holding the femur on the tibia are sufficiently powerful to prevent the femur slipping forward into flexion. This condition must always be kept in mind when deciding whether a muscle transference at the knee would improve the walking power. Practically, the walking power is the object to be improved rather than the appearance of the limb. The manner in which the function of one joint is affected by that of the joint above or below it must be carefully considered, and never can the action of gravity be neglected.

The line of gravity in the erect standing position falls through the head of the femur, the anterior part of the knee joint, the middle of the ankle joint, and reaches the ground under the os-calcis about an inch behind its articulation with the cuboid.

The center of motion at the hip joint is at the center of the head of the femur. The transverse axis of motion at the knee joint passes through the posterior part of the condyles about half an inch above the joint surface. The transverse axis of motion at the ankle passes approximately through the tip of the internal malleolus.

On standing erect therefore, were no muscular power exerted, equilibrium would be established at the hip joint as the centers of motion and gravity correspond. Under like conditions the knee would tend to hyperextend, as the center of motion is so far behind the point through which the line of gravity passes at this joint. At the ankle the line of gravity passes through the center of motion, and equilibrium is established here also.

The strain on the structures at the hip joint, on account of the direction of the neck of the femur downward, outward and backward is greater on the anterior part of the joint, and the anterior ligaments are the more powerful. At the knee the posterior ligaments are the stronger as if to counterbalance the greater strain posteriorly. At the ankle there is greater strain on the posterior part of the joint on account of the much greater length of the anterior lever. The anterior and posterior ligaments here are however much less important than the

muscles and the shape of the articulating surfaces in resisting this strain.

It would be difficult to estimate the relative power of the flexors and extensors at these joints. The power of a muscle is thought by some to be in proportion to its bulk. The effect that may be produced by a muscle depends also as much upon the length of the lever to which it is attached and the angle at which the force is exerted. The greater bulk of one set might therefore be counterbalanced by its less favorable leverage.

It might not be impracticable, however, to draw some conclusions from the position assumed by the limbs in spastic paraplegia, where all the muscles are acting at once and without the direction of the will. In these cases the extensors of the hip, knee and ankle seem more powerful than the flexors since they control the position of the limb.

If this is the normal relation, does it aid us at all in devising how best to utilize the remaining power in a partially paralyzed limb? In general, it would seem to indicate strengthening the extensors, even at the expense of the flexors.

As I have said before, the joint function is so dependent on that of the joint above and below that an almost unlimited number of combinations can exist, and theory must therefore, after all, be proved by practice.

At the knee joint, which especially interests us here, the power of the extensors is most required when weight is borne, as the limb may be advanced sufficiently to place the foot in proper position on the ground, by thigh flexion, combined with the swing forward of the leg under the force of gravity.

If, then, a case presents almost total paralysis of the extensor power at the knee, walking will not be possible unless the foot can be held strongly extended, so as to bring the point where the line of gravity strikes the ground when the weight is borne far forward on the ball of the foot; that is, well in front of the knee joint. This increases the tendency to hyperextension at that joint, and makes a very little power in the extensor muscles sufficient to preserve equilibrium.

Another method, which I have mentioned, by which flexion is prevented is the pull backward on the head of the tibia when the

foot is fixed upon the ground. The muscles here act at great mechanical disadvantage, but I have notes on a number of such cases, who walked quite well, some even with a badly paralyzed foot in addition. These cases are comparatively rare, however, especially as muscles sufficiently strong to do this usually become contractured from lack of normal balance anteriorly, and so cause permanent flexion of the knee, which greatly increases the difficulty of maintaining equilibrium.

In this last class of cases the operation of transferring some of the posterior muscles, so that they act as extensors, is very useful, and acts in two ways, both of which are important; the deforming flexor force is removed or diminished so that the knee may be fully extended; and the extensor muscles are strengthened directly by the muscle transferred. A third advantage is that the extensor muscles are thus stimulated powerfully and regain in some instances part of their own power. The two following cases illustrate these points:

O. A. had an attack of spinal meningitis, with involvement of the anterior horns, when eleven months old. The paralysis affected the lower limbs only. He had good care, with the object of preserving and increasing the nutrition of the affected parts and the prevention of contractions. The left limb recovered almost completely. The right knee, in spite of all precautions, twice became markedly flexed, and was straightened under an anæsthetic, but had relapsed again when I saw him first last June. He was then fifteen years old; in fair general health, and well grown for his age. There was no spinal curvature. The left limb was nearly normal in power and motion of joints. *Right hip.*—Angle of greatest extension, 170°; angle of greatest flexion, 45°; abduction, 5°; adduction, 45°; rotation inward, 20°; rotation outward, 90°; power of hip muscles fairly good. *Right knee.*—There was a firm contracture of the flexor muscles and tissues posterior to the joint, which prevented extension beyond 135° by any reasonable force. He could not himself extend the leg at all. There was fair power in ham-string muscles, especially the internal group.

At the foot there was a very little power in peroneus tertius and extensor longus digitorum only. The foot, therefore, hung limp, and when weight was borne took a position of calcaneo-valgus.

From anterior superior spine of ilium to internal malleolus the right limb measured three inches shorter than the left; one inch and a half of this was in the tibia. The right calf was one inch and a half smaller than the left, and the thigh one inch and three quarters.

The boy walked with crutches, using the left limb only. He had no power whatever to bear weight on the right limb.

In this case it seemed best to transfer part or all of the internal hamstring group into the quadriceps femoris, for the double purpose of removing the strongest force producing the contracture at the knee and of adding a certain part of that power to the anterior muscle. In addition to this, the foot should be fixed in a position of equino-varus. As the circulation was very poor in the limb, I decided to defer the second operation until the success of the first was assured.

Accordingly, September, 1908, the semi-tendinosus and semi-membranosus were exposed, and their tendons freed near their tibial attachments; they were then dissected up, in bulk as it were, about seven inches, taking care to preserve as far as possible the fascia covering them. An incision was then made in front, exposing the inner edge of the rectus muscle from the patella upward about five inches; this incision was then carried through the vastus internus and the adductor longus between the vessels and the bone, and the muscles previously freed were pulled through this and fastened with several layers of kangaroo tendon and chromic gut sutures to the inner and anterior surface of the rectus and its sheath as near the patella as the length of the muscles would allow. Cargile membrane was wrapped around the surfaces of the muscles not covered already by fascia. The direction of the muscular pull by this method is comparatively straight from the tuber ischii to the patella, and all constriction of the vessels or nerves is avoided. Care is taken to avoid twisting the transplanted muscles when they are fastened in place. The contraction of the knee was fully corrected, this requiring considerable force, before the sutures were fastened. The dressing was completed by a plaster of paris spica from the toes to the waist.

October 24 the cast was removed. Wounds healed perfectly, and the circulation good in limb. The ankle joint was then opened from the outer side; the astragalus was dislocated, and the cartilage on its upper and lateral articular surfaces removed. The fibula was then divided just above the malleolus, and after the astragalus had been returned to its normal position, was pushed firmly against this bone and nailed there. The tibia was also nailed to the astragalus. The plaster splint then applied held the foot in equinus of 110° and in slight varus. No pain was felt after the operation. The nails were removed in two weeks and the plaster replaced by a walking splint January 11, 1909, and massage begun.

Examination at this time showed considerable power in the extensors of the knee, and a strong pull exerted by the transplanted muscles, so that the limb could be raised easily with leg extended. The foot was in good position and the arthrodesis at ankle seemed firm.

April 2, 1909, patient can extend leg to 165°. There is no contraction at the knee. Power in quadriceps improving steadily. Foot in good position, but a very slight degree of motion detected in ankle joint. Measured for extension shoe to equalize length of limbs. The boy is now walking with his brace and one crutch. The knee can now be flexed a little by the patient himself, but in the manipulations it is not carried beyond 45° to avoid stretching the anterior muscles. He will wear his walking splint for six or eight months more.

J. M. An attack of poliomyelitis in 1901, when he was about two years of age, paralyzed both lower extremities. After a year the power in the right had returned almost to normal, but there was little improvement in the left. The foot was in calcaneo-valgus and there was no power at all to extend the leg.

May 29, 1907, I freed the tendo-acillis from its insertion and transferred it to the inner side of the os-calcis in order to overcome the valgus. The tendon was passed through a slit in the periosteum and fastened on all sides to the periosteum by chromic gut sutures. The astragalo-scaphoid articulation was then opened and the cartilages pared off, and the bones sutured with strong chromic gut to produce an arthrodesis at this joint if possible.

An incision was then made along the inner border of the rectus, just above the patella, extending upward four inches. The semitendinosus was then exposed and dissected up for about five inches through an incision in the popliteal region, and the tendon brought through the adductor longus and the vastus internus, between the vessels and the bone, as in the other case, and firmly fastened to the rectus and its sheath with chromic gut sutures. The limb was then put up in plaster with the foot in slight varus and the knee fully extended.

July 17, 1907, the foot was still in varus, but there was a slight tendency for the calcaneus to recur. There was some power to extend the foot, and the leg could be extended to 160°. A walking brace was applied to fully extend the leg and protect the foot and massage was ordered. The child was then lost sight of until March, 1909. Then there was slight motion at the astragalo-scaphoid joint and a slight tendency to valgus, but the position was very much better than before operation. The patient can flex ankle to 45° and extend to 130°. The power in the quadriceps was considerable and could extend the leg to 150° easily. There was no contraction at the knee. The child walked very well, wearing simply a shoe stiffened a little at the sides, so that the parents, delighted with the result, had given less attention to developing the muscles than I wished.

The operation on the ankle, as described in the last case, I have

found very satisfactory in a number of instances where the valgus had been troublesome. Even in the younger children the transplantation of the tendo-achillis is successful, but where the bones are not well calcified the production of an arthrodesis usually fails, though the union is made much stronger and the deformity greatly reduced.

Neither of the boys can fully extend the leg as yet. One can extend it to 165° and the other to 150°. As there was no power at all of extension before the operation in either case, and as both are improving, I expect the final result to be better still. In both cases the power already secured is more than sufficient to enable them to walk easily without any support to the knee.

T. Halsted Myers.

April 21, 1909.

CHILDREN'S DIVISION

	Cured	Improved	Unimproved	Died	TOTAL
DISEASES OF THE LUNGS.					
Bronchitis	7	..	..	..	7
Bronchitis, adenoids (curettage of adenoids)	2	..	..	..	2
Pleurisy with effusion	7	1	..	..	8
Pleurisy with effusion, pericarditis	...	..	..	1	1
Pleurisy with effusion, pulmonary tuberculosis	...	..	1	..	1
Chronic pulmonary tuberculosis, bronchitis	...	1	..	..	1
Acute lobar pneumonia	4	..	..	..	4
Double lobar pneumonia, meningismus	1	..	..	..	1
Broncho-pneumonia	9	1	..	6	16
Broncho-pneumonia, rachitis	...	..	..	1	1
Broncho-pneumonia, rachitis, pulmonary tuberculosis	...	..	..	1	1
Broncho-pneumonia, empyema	...	..	..	1	1
Total	30	3	1	10	44
DISEASES OF THE HEART.					
Myocarditis, pericarditis, hydrothorax	...	..	..	1	1
Chronic endocarditis	...	8	1	2	11
Chronic endocarditis, pericarditis	...	2	..	1	3
Chronic endocarditis, chorea	...	1	..	..	1
Chronic endocarditis, acute dilatation, hydrothorax, wry neck, secondary anæmia	...	1	..	..	1
Chronic endocarditis, rheumatoid arthritis, chronic nephritis	...	1	..	..	1
Malignant endocarditis, septic pneumonia, panophthalmitis septic meningitis	...	..	..	1	1
Total		13	1	5	19
DISEASES OF THE GASTRO-ENTERIC TRACT.					
Acute gastro-enteric intoxication	2	..	..	1	3
Acute gastritis	1	..	..	..	1
Gastro-enteritis	10	1	..	..	11
Ulcer of the stomach	1	..	..	..	1
Chronic indigestion	...	1	..	..	1

	Cured	Improved	Unimproved	Died	Died
DISEASES OF THE GASTRO-ENTERIC TRACT.—Concluded.					
Diarrhœa	1	..	..	..	1
Dysentery	1	..	..	..	1
Tubercular peritonitis	...	..	1	..	1
Tape worm (tænia solium 1, tænia saginata 1)	2	..	..	..	2
Total	18	2	1	1	22
GENERAL DISEASES.					
Typhoid fever	10	..	..	..	10
Typhoid fever with hemorrhages	1	..	..	..	1
Hereditary syphilis	...	2	..	..	2
Scurvy	1	..	..	..	1
Diabetes mellitus	...	..	..	1	1
Acute chorea	...	1	..	..	1
Sub-acute rheumatism, endocarditis	...	1	..	..	1
Rheumatoid arthritis, endocarditis	1	..	..	..	1
Peliosis rheumatica, pericarditis with effusion	1	..	..	..	1
Measles, broncho-pneumonia	...	..	1	..	1
Scarlet fever	1	..	..	..	1
Diphtheria	5	..	..	..	5
Tubercular meningitis	...	..	..	5	5
Cerebro-spinal meningitis	...	..	..	2	2
Pneumococcus meningitis	...	..	..	1	1
Rachitis, cystitis	1	..	..	..	1
Total	21	4	1	9	35
MISCELLANEOUS DISEASES.					
Marasmus	5	3	[1]1	5	14
Marasmus, fistula in ano	...	[2]1	..	..	1
Marasmus, gonorrheal vaginitis	...	..	..	1	1
Marasmus, acute dilatation of the stomach	...	..	..	1	1
Marasmus, gastro-enteritis	...	..	..	1	1
Malnutrition	2	1	..	1	4

1 Left against advice.
2 Transferred to Surgical Division.

	Cured	Improved	Unimproved	Died	TOTAL
MISCELLANEOUS DISEASES.—Concluded.					
Inanition	1	..	..	1	2
Malnutrition, otitis media	...	1	..	..	1
Feeding cases	4	5	..	..	9
Hydrocephalus	...	1	..	..	1
Hydrocephalus, broncho-pneumonia	...	..	..	1	1
Birth palsy	...	1	..	..	1
Brain abscess	...	..	[1]1	..	1
Lateral sinus thrombosis, subluxation of femur	[2]1	..	..	..	1
Ruptured choroid	...	1	..	..	1
Acute exudative nephritis	1	..	..	..	1
Sub-acute nephritis	1	..	..	..	1
Pyelitis	...	1	..	..	1
Pyelitis, quinine poisoning	1	..	..	..	1
Paraphimosis	1	..	..	..	1
Gonorrheal vaginitis	7	1	..	..	8
Gonorrheal vaginitis, gonorrheal endocarditis	[2]1	..	..	..	1
Intussusception	...	..	[1]1	..	1
Eczema	2	..	..	..	2
Urticaria	1	..	..	..	1
Tonsillitis	1	..	..	..	1
Hypertrophied tonsils (tonsillotomy)	1	..	..	..	1
Sprained ankle	1	..	..	..	1
For observation	...	2	..	..	2
No hospital condition	...	..	1	..	1
Total	31	18	4	11	64
Total Children's Service	101	39	8	36	184

1 Transferred to Surgical Division.
2 And improved.

LESIONS OF THE CORNEA IN GONORRHŒAL OPTHALMIA AND PHLYCTENULAR KERATITIS.

COLMAN W. CUTLER, M.D.

The two diseases which are most threatening to vision in childhood are gonorrhœal ophthalmia and phlyctenular keratitis. These diseases are dangerous, because they may invade the cornea, the transpareney and smoothness of which is indispensable to the formation of a clear retinal image. A nebula or a slight irregularity or facet of the surfaee almost impereeptible to the observer, unaided by a suitable lens and source of light, may distort the refracted rays so that vision is seriously impaired. It is important that all who have the medical care of children should have a lens at hand and should praetice the examination of the cornea with oblique illumination.

In a healthy child which can remain at the breast, if gonorrhœal ophthalmia is taken early and runs an average course, the prognosis is usually good with very little treatment beyond careful cleansing and the use of protargol or argyrol. Such cases offer no serious problem, but in every group of ten or twenty cases, there may be one whose resistance is poor or in whom the infection is virulent, in which corneal complications may arise, which change the aspect of the case entirely.

The problem is threefold: To protect the cornea during cleansing and medication; to combat the virulence of the disease and to maintain the nutrition of the child as well as of the eye.

Some opthalmologists rely so fully on the milder silver salts that the eversion of the lids and the forced inspection of the cornea seem to them in most cases superfluous. If this confidence were well founded it would relieve the surgeon of a grave sense of responsibility, not only as to the nurse's technic in cleansing the eyes, but as to his own in inspecting the cornea, for the separation of the lids in a struggling baby may easily entail pressure or friction, which would abrade the weakened epithelium and open the door to the dreaded infection. It seems probable that most ulcers not at the

margin of the cornea follow an epithelial defect due to traumatism. It has been urged, therefore, that the first examination in severe cases should be made under an anæsthetic.

Elevators and specula are exceedingly dangerous in any hands, and yet it is often difficult to see the whole cornea without them. It has seemed easier and safer in some cases to grasp a fold of the skin near the margin of the upper lid with a blunt, rounded forceps and draw the lid away from the eye and upwards, or it may be possible to use the elevator without inserting it under the lid, by catching it in a fold of the skin near the margin as the child wrinkles the lids in resistance; but where there is much swelling this cannot be done, and in some cases one must wait until the swelling subsides to get a view of the whole cornea unless the outer canthus is divided. It should be one of the first and most explicit directions given to students, and the house staff and nurses should be trained not to touch the cornea with cotton and to exercise the utmost care in inspecting and in cleansing the eye.

If an ulcer develops, can we do much that is really effective to control it, bathed as it is by the pus, in spite of the most careful cleansing? In some cases it has been possible by means of a light touch of a dull cautery point, or by the use of pure carbolic, to seal the lymph spaces and protect the exposed layers by an eschar until the vigorous treatment of the conjunctiva controlled the disease and a small nebula or a clear facet resulted. These measures, however, are not very easy to apply, as they presuppose an eye held open and immobile, lest the cautery destroy clear tissue. If the child is well nourished and the infection is not severe the progress of the ulcer may be controlled by the usual treatment of the conjunctiva, so that a portion of the cornea remains clear with useful vision, but too often, in infants brought into an institution with the cornea involved the result is a dense leucoma or perforation. Often such children are marasmic and die as the ophthalmia improves. The child loses weight because of the constant interruptions of sleep, the stools are green and foul and, at the same time, the eye becomes paler and the secretion diminishes as if the tissues had not the vitality to support the infection, but the cornea simply melts away. A paper by Lobenstine and Harrar (Bull. of the Lying-in-Hospital, Dec., 1906) "Effects of Gonorrhœa in the

Mother on the Early Nutrition of the Child," explains these tendencies of a general nature, which must inevitably diminish the resistance of the cornea. In such cases the milder silver preparations are indicated, but in all sthenic cases nitrate of silver to the everted lids, 1 per cent. or 2 per cent., once or even twice a day is indispensable. The fact that the nitrate forms an albuminate is often stated to its disparagement, but the silver albuminate is also highly inhibitory to the gonococcus and remains a longer time in contact with the tissues.

Very little dependence should be placed on protargol or argyrol in these severe cases, they are dropped into the eye every hour or two during the day, and probably they help, but, in my experience during the past few years, nitrate of silver has become a rule, as I have watched the unexpected complications arise in apparently mild cases treated by mild methods. Protargol and argyrol are of use, however, as prophylactics, in measles and scarlet fever, and there have been fewer severe corneal complications at the Foundling Hospital since these preparations have been used systematically. An additional argument in favor of nitrate of silver is offered by Zur Nedden in a suggestive paper read at Heidelberg in 1907 on the presence of bactericidal substances in conjunctival secretion. He states that the normal conjunctival secretion and the tears have no influence on bacteria, while the pathological secretion is distinctly bactericidal, This is especially true of the gonorrhœal secretion, both the cellular and the fluid portions being active. Those who heard Prof. Hiss' lecture before the Harvey Society will realize the importance of this consideration.

Zur Nedden contrasts the action of disinfectants like mercury, which destroy the bacteria when in contact, but which have little or no effect on the course of the disease, with nitrate of silver, which acts not only as a disinfectant, but produces a transudation of serum and leucocytes, which is more efficient, and with sulphate of zinc, which is very efficient in diplobacillary conjunctivitis, although its bactericidal action is slight. He claims that the astringents which produce exudation or transudation are most active and that the bactericidal substances in the leucocytes and lymph increase in proportion to the severity of the inflammation.

A point upon which stress may be put is the use of cold and heat.

The thermal death point of the gonococcus is low and the temperature of irrigations may be raised to 108°, 110°, or possibly higher without risk. Observation and experiments in this line on the lower animals would be of value, which would show the limits of temperature which may be used in safety.

It is stated by Finger and others (Kolle & Wasserman, 3 Band, p. 169) that at a temperature of 40°, 41° C. the gonococcus is killed in a few hours. In the body during a fever temperature of 40° C. the gonococcus is inhibited and the urethral discharge ceases. Finger also has failed to inoculate the urethra during high fever.

If these temperatures of 104° or 105° F. are so detrimental to the gonococcus, it seems desirable to try the effects of somewhat higher temperature with mild antiseptics and astringents in the eye, and it is probable that hot irrigation by thorough cleansing and the increase of conjunctival hyperæmia (Bier) and transudation (Zur Nedden) may be beneficial.

Such irrigation may be given once, or, in severe cases, twice a day; the quantity should be a quart or more to produce more than a superficial effect. Kalt uses a larger quantity of permanganate solution, but does not lay stress on the temperature, which I desire to emphasize.

In a recent case I have used copious irrigations of boric acid and of salt solution at a high temperature, and have been encouraged to continue them as a routine measure.

Cold compresses seem illogical in all stages—they depress vitality more than they inhibit the gonococcus. It is probable also that cold lessens the bactericidal action of the serum and the leucocytes which Professor Hiss has demonstrated.

It is easy to insert a thermometer in the fluid and to maintain a fixed temperature by a small lamp. As an irrigator, the perforated speculum of Callan with larger apertures for the fluid is better than the funnel which Kalt uses for irrigations with permanganate solution, because with the former the current is directed towards the fornix instead of against the cornea. Finally, it would seem that this method of applying heat was better than hot compresses, because hot compresses in practice act as a poultice and retain the secretion, and, if given carefully, the irrigation does not seem to macerate or weaken the epithelium of the cornea.

Another measure upon which it is premature to report in detail is the suspension of lactic acid bacillus prepared by Dr. Charles E. North. This has been used in a number of cases at the Foundling Hospital, and while it is too soon to claim definite results, it is at least harmless and has seemed to hasten recovery notably not only in gonorrhœal opthalmia, but in acute conjunctivitis due to the diplobacillus and to pneumococcus. This may be due in part to the acid reaction of the solution since the gonococcus and other pathogenic bacteria grow best in a slightly alkaline medium, but the drying of the secretion and diminution of inflammatory reaction would indicate a specific antagonism of the harmless lactic acid bacillus for the pathogenic cocci. It is quite painless, and may be used freely to irrigate the conjunctiva several times a day.

It has not seemed safe in severe infections to confine the treatment to this suspension of lactic acid bacillus, but as an adjuvant to the usual measures, and in milder cases alone, it has won a place in our routine.

Phlyctenular disease is so familiar that one hesitates to refer to it, but its etiology and nature are still unknown. It is probable that the general group of so-called phlyctenular conjunctivitis and keratitis must be subdivided into at least two distinct forms.

Morax, quoted by Axenfeld, does not consider that the eruptions at the margin of the cornea, which are superficial and vesicular in form, or which may occur as ulcers in the course of any acute conjunctivitis, are of the nature of true phlyctenules which are subepithelial. Leber and Baas describe the corneal phlyctenule as a solid nodule, beginning beneath the intact Bowman's membrane, therefore of endogenous origin; Leber found in three cases out of four numerous giant cells; so that the structure might be described a tuberculoid. No bacteria have been found in these nodules.

Scrofula is an unscientific word, but in this connection it is significant; in its clinical manifestation, it is usually associated with phlyctenulosis or the phlyctenular disposition, but cases of phlyctenules occur in otherwise healthy eyes and in children with no other manifestation of scrofula; it is probable, then, that these conditions have a common cause, but may not be coincident. Axenfeld states that he has always obtained a positive reaction with tuberculin

in these cases. The last ten cases of phlyctenular keratitis that I have seen have all given a positive reaction to Von Pirquet.

This leaves the causation of the group of superficial vesicles or pustules open, and they may be due to the action of the diplobacillus or the staphylococcus or to Koch-Weeks's bacillus, but the clinical evidence points to a predisposition even if the exciting cause in these cases may come from without. It is important to make this distinction if we are to regard true phlyctenules as manifestations of a toxæmia probably tubercular.

It has been suggested that the cause is tubercular toxin from a distant focus, but they occur often in children without any signs, such as the glandular enlargement or malnutrition, of active tuberculosis; moreover, they are almost entirely limited to childhood and adolescence, and if they were a sign of toxæmia, they would certainly occur in outspoken cases of the disease in adults.

Verhoeff has recently offered an explanation, which is difficult of proof, but is interesting. He attributes them to the phenomena of Anaphylaxis. To quote his words: "Let us suppose that in early life, perhaps in infancy, an infection with tubercle bacilli takes place and is perhaps followed by recovery. In accordance with the theory of Anaphylaxis, all the tissues might be sensitized by the toxins, but some more than others. If the child continues to live under satisfactory hygienic surroundings and remains otherwise healthy, no harm will result. But if some infectious disease like measles occurs, or the resistance is lowerd, so that the old infection becomes active again or a new infection follows under these conditions, the tissues previously electively sensitized may react to the first supply of tubercle toxin, thus producing the characteristic lesion."

That is to say, the previous infection has so sensitized the tissues that an insignificant reinfection or exacerbation will produce results out of proportion to its own magnitude.

In the same manner we may explain the reaction to tuberculin when the supposed focus is undiscoverable. Also it seems fair to assume that the hypersensitiveness may diminish with years, thus explaining the diminishing frequency of phlyctenules and scrofula in adult life.

It has been said by Calmette and by Wolff-Eisner that "those who are predisposed or susceptible are already tuberculous and are

actually combating tuberculosis." This is not a new idea, but it makes it doubly important, especially in children, in the warfare against this disease to grasp the signs of a latent but still active focus, and not to content ourselves with treatment of the local manifestations.

Since the phlyctenules are not due to direct infection, they are self-limited or limited by the resistance of the soil, therefore the mild irritation of calomel, etc., promotes their absorption and prevents secondary infection, but the obvious conclusion is that the child's resistance must be built up in every way to prevent the relapses which are so suggestive of the underlying condition.

I am convinced that more eyes are damaged by phlyctenular keratitis than by gonorrhœa. Of course, the injury is not so severe, but an opacity or a facet in the pupillary zone, among the children of the poorer classes, is so common and is such a serious hindrance to higher economic usefulness that the attention of the general practitioner and of the public may well be drawn to these fleeting and apparently insignificant eruptions.

8 East 54th St.

A STUDY OF FRACTURES OF BOTH BONES OF THE FOREARM.

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Among 541 consecutive cases of injuries to the forearm observed in the out-patient department of St. Luke's Hospital, fractures have contributed a large majority of the lesions, with fracture of the lower end of the radius, of course, overwhelmingly predominant. The following table presents the frequency of the occurrence of the various types of injuries:

LESIONS.	NUMBER OF CASES.
Colles's fracture	235
Sprained wrist	110
Fracture of ulna alone	37
Fracture of shaft of radius alone	36
Fractures of the shafts of both bones	50
Other injuries	73
Total	541

Fractures involving the shafts of both bones of the forearm form an interesting clinical group distinct from the Colles type, although the latter is often really a double fracture, including a rupture of the styloid process of the ulna. The figures given by Stimson (1), who states that of his cases of Colles's fractures but ten per cent. showed an accompanying break of the ulnar extremity, are not in agreement with those furnished by the skiagrams, which contribute to this study. Scudder has found eighty per cent. of his cases of fracture of the lower end of the radius to be associated with a broken styloid process of the ulna, a proportion which would, it is believed, closely correspond with what has been observed in the out-patient department of St. Luke's Hospital.

The radius and ulna are exposed alike to violence, as might be expected in the case of two long bones of about the same size lying side by side in an extremity. But the greater part of the longitudinal stresses received through the carpus and transmitted to the humerus are borne by the radius with its broad lower end and its

upper extremity impinging squarely against the capitellum of the humerus. Hence a fall with the body weight coming upon the outstretched palm most commonly breaks the radius, but if the violence be severe enough the ulna will, on account of its close bonds with the radius through the connecting ligaments and interosseous membrane, receive enough strain to be fractured also. In the case of direct violence the ulna, longer and more superficial, is the first to give way, but if the violence be forcible enough, its companion, the radius, will be broken too.

The muscles of salient importance connected with fractures of both bones of the forearm are the following: The biceps, with its powerful flexing and supinating effect, exerted through the bicipital tuberosity at the upper end of the radius. The broad supinator brevis, folded around the upper third of the radius, tends not only to supinate the upper fragment of a broken radius, but also to draw it toward the ulna. The supinator longus, pulling upward and backward upon the outermost part of the broadened lower end of the radius, tends to draw the lower fragment of this bone, when fractured, toward the ulna. Any involuntary supinating effect by this muscle upon the lower fragment of a fractured radius seems to be lacking. The pronator quadratus, whose transverse fibres pass across directly from ulna to radius in the lower fourth, sometimes pulls together the fractured lower fragments of these bones. The pronator radii teres, coming down obliquely across the anterior surface of the forearm and inserted at the middle of the convexity of the shaft of the radius, seems to have received an undue amount of consideration as an opponent to the supinating action of the upper supinators. It has been commonly maintained that a faulty supination of the upper radial fragment occurs only in those cases where the fracture is at a point above the insertion of this muscle. It has been held that in fractures below the middle of the radius no faulty rotation of the upper fragment would occur, because the strong pull of the pronator radii teres would overcome the tendency to supination by the biceps and supinator brevis. Hence the practice advocated by some, of treating all those cases of fractures of the radius occurring above the insertion of the pronator teres by immobilizing the forearm in the supine position. The question of the correctness of this practice is discussed in the following:

Among the fifty cases of fracture of both bones of the forearm, upon which this paper is based, all but six occurred in the first two decades of life. The remainder were scattered about evenly up to the age of the oldest patient, who was sixty-six years old.

Males were more commonly met with than females in the proportion of four to one.

1. W. B. FRACTURE OF BOTH BONES WITH OVERLAPPING, WHICH WAS IRREDUCIBLE. FIG. 17 IS A VIEW OF THE SAME AFTER OPERATION WITH ALUMINUM CLEAT AS DESCRIBED IN TEXT.

The location of these fractures of both bones has been either at the same level or, if at different levels, with a slight predominance of cases where the break was higher on the ulna than on the radius. Here is a variation from the figures of other writers, who state that the radius is usually fractured higher up than is the ulna.

Transverse fracture occurred in seventy-five per cent. of all cases in which the type was recorded.

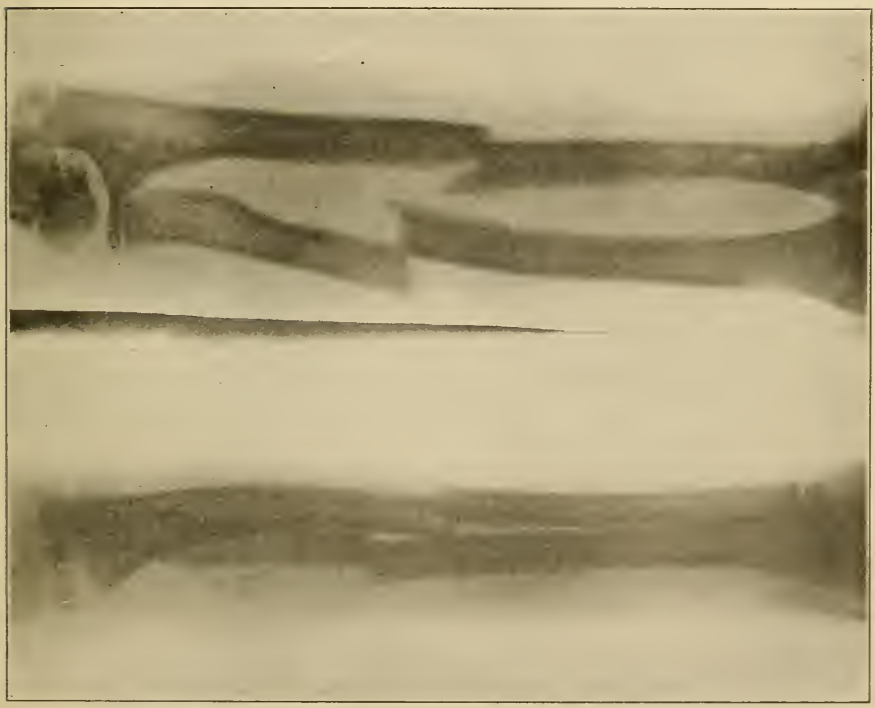
The oblique type was the next in point of frequency, with only an occasional greenstick and but two comminuted and two compound fractures.

The danger of cross union between radius and ulna seems to have been overestimated. Callender[3] mentions that among the many specimens to which he had access in the hospital museums of London, and in the literature, but four cases showed cross union of the shafts of radius and ulna. Where the callusses of adjacent fractures meet across the interosseous space, a new gliding joint between the bones not infrequently follows. In the cases under present observation cross union has not occurred, and I believe that many cases described as instances of this have been wrongly diagnosed on account of the symptom of loss of rotation.

The majority of these fractures were sustained by direct violence. Nearly all those which resulted from indirect violence occurred where the younger patients fell upon the outstretched palm. If they had been adults a Colles's fracture would have resulted in all probability.

The type of displacement of the fragments depends upon the direction of the violence and upon muscular action. They are found displaced in all possible directions. Both lower fragments may be found anterior or both posterior (Fig. 1), or one may be displaced anteriorly and the other posteriorly. (Fig. 2.) Again both lower fragments may be found to have been displaced to either radial (Fig. 3) or ulnar side or to opposite sides. (Fig. 2.) In the cases of greenstick fracture and in some complete fractures there will be found practically no displacement at all. (Fig. 4.) The frequency of the approximation of the bones after these fractures would seem to have been exaggerated by some writers. In fact, the effect of muscular action in producing displacements seems to be variably manifested or even not displayed at all at times. For instance, the pronator quadratus and supinor longus may seem to exert no influence toward approximating the lower fragments (Fig. 4), while again they would appear to be potent factors toward that end. (Fig 2.) Furthermore, the upper fragments are found to be well separated (Fig. 2) nearly as often as they are seen to be approximated by the pronator teres and supinator brevis. (Fig. 5.) And while theoreti-

cal considerations would seem to require that the biceps should supinate the upper radial fragment only in the cases of fractures occurring above the insertion of the pronator teres, yet, as will be shown below, such is by no means the case. (Fig. 7.) As would naturally be anticipated, angular deformity of the forearm when both bones are fractured may exist in a degree impossible where one remains intact as a splint. (Fig. 6.)



2. FRACTURE OF BOTH BONES WITH APPROXIMATION OF LOWER FRAGMENTS.

Where the radial and ulnar fragments are approximated the resulting diminution of the interosseous space may interfere with rotation after union as may also the excessive formation of callus.

The peculiar rotatory function of the radius is associated after fracture with certain results which repay study. Supination and pronation are movements almost constantly employed while the hands are in use and their impairment is a serious disability. As Callender[3]

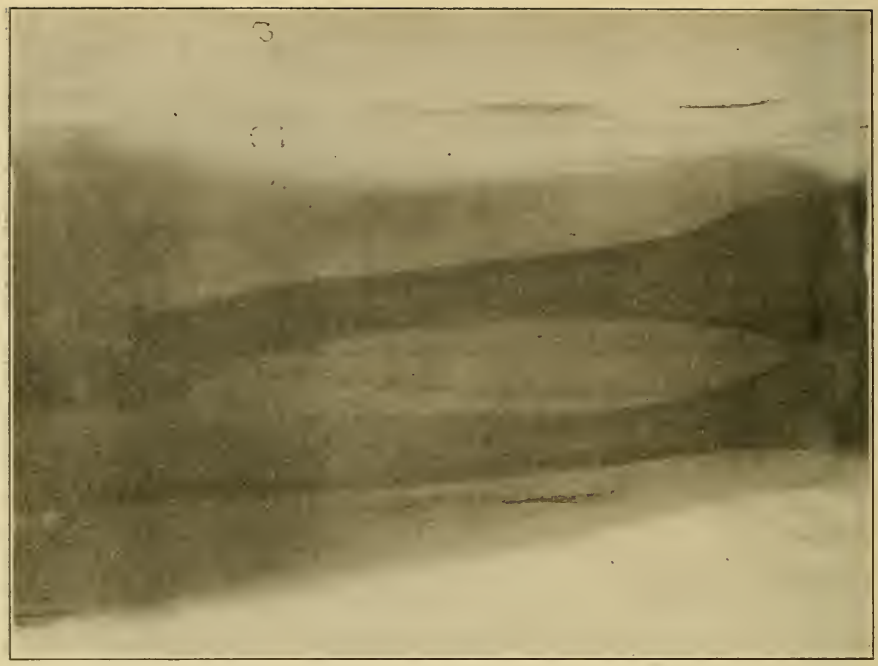
3. FRACTURE OF BOTH BONES. BOTH LOWER FRAGMENTS DISPLACED TO RADIAL SIDE.

4. FRACTURE OF BOTH BONES. PRACTICALLY NO DISPLACEMENT. BEFORE REDUCTION THE DEFORMITY WAS SIMILAR TO THAT SHOWN IN FIG. 1.

has put it "It is a considerable hurt to anyone to have rotation of this bone (radius) stopped abruptly midway between pronation and supination, the natural movements being but badly compensated for by an awkward action from the shoulder, with bending in of the elbow."

In those cases which the writer has had the opportunity of observing, fracture of the radius has been often followed by a greater or less impairment of supination of the hand. The reason for this too commonly imperfect result has apparently been the routine custom of immobilization with the hand semiprone as practiced by most surgeons. Following such a fracture the biceps and supinator brevis are very likely to turn the upper fragment on its long axis while the lower fragment is kept semiprone. It is evident that if union takes place with the upper fragment supinated and the lower fragment semiprone or prone, it will be impossible to supinate the hand completely or even partially. When the fragments unite in such a relation to each other every degree of rotation of the upper fragment upon the lower is a degree of rotation lost to the limb below.

Lonsdale[4] in 1838 advocated the supine position in the treatment of all cases of fracture of both bones of the forearm in which the point of fracture of the radius was above the insertion of the pronator teres muscle, and a respectable number of authorities have followed his example. But of late years, few writers or teachers, so far as has been ascertained, have used any other than the semiprone position, although Hamilton[5] and some others admit the frequent occurrence of rotary disability. The maintenance of full supination in a splint is uncomfortable to the patient and this may be one reason for its unpopularity, especially since there has been no certain way heretofore of determining whether or no faulty rotation of the upper fragment were present until after union had occurred. But the attempt will be made below to describe a method whereby the presence or absence of faulty rotation in the living bone may be demonstrated in nearly every case of fracture of the shaft of the radius. If this can be done, it would seem to be the duty of the surgeon to individualize these cases which come under his care and treat them according to the specific indications present instead of depending upon a routine practice which may or may not be applicable in any particular instance.



5. FRACTURE OF RADIUS. UPPER FRAGMENT DRAWN TOWARD ULNA BY PRONATOR TERES AND SUPINATOR BREVIS.

6. FRACTURE OF BOTH BONES. ANGULAR DEFORMITY IN A DEGREE IMPOSSIBLE WERE EITHER BONE FRACTURED ALONE. SHOWS SILVER WIRE USED IN AN UNSUCCESSFUL ATTEMPT TO OVERCOME DEFORMITY BY SUTURE.

As will be shown it is not uncommon to find supination of the upper radial fragment while the lower remains semiprone even where the fracture has occurred below the middle of the bone. Details concerning this point are given in the following table which was compiled from those skiagrams forming the basis of this paper. The scarcity of skiagrams which are clearly defined enough to illustrate faulty rotation is due to the imperfection of instruments and methods employed in the earlier years of X-ray work.

NO.	PATIENT.	AGE.	SUPINATION OF UPPER RADIAL FRAGMENT. PRESENT.	ABSENT.	LOCATION OF FRACTURE.
1	B.	?	1		Lower third.
2	F. B.	15	1		Upper part of middle third.
3	G. M.	9		1	Lower third.
4	W. H.	5		1	Lower third. (Green-stick.)
5	D. V.	13		1	Lower third.
6	N. S.	12	1		Junction middle and upper thirds.
7	J. F. R.	20	1		Junction middle and upper thirds.
8	E. T.	7		1	Lower third.
9	R. T.	10		1	Junction middle and lower thirds.
10	C.	8		1	Lower part of middle third.
11	J. N.	25	1		Lower part of middle third.
12	M. M.	17	1		Upper part of middle third.
13	W. C.	66	1		Junction of middle and lower thirds.
14	T. K.	11		1	Lower part of middle third.
15	E. K.	14		1	Junction of middle and lower thirds.
16	G. I.	11		1	Lower third.
17	W. B.	14		1	Lower third.
18	N. L.	32		1	Lower third.
19	M. McM.	12		1	Lower third.
20	E. T.	11	1		Upper middle third.
21	F. P.	13		1	Junction middle and lower thirds.
22	H. C.	?	1		Upper third.
23	T. H.	?	1		Upper third.
24	X. M.	19		1	Upper middle third.
25	H.	13		1	Upper part of middle third.
26	J. F.	?	1		Middle of bone.
27	Y.	30		1	Middle third.
28	M.	?		1	Lower third.
29	C.	9		1	Lower third.
30	W. B.	68	1		Lower third.
31	W. F.	6		1	Middle of bone.
32	C.	44	1		Junction lower and middle thirds.
	Total		13	19	

7. FRACTURE OF BOTH BONES AT JUNCTION OF MIDDLE AND LOWER THIRDS. SHOWS ROTATION OF UPPER RADIAL FRAGMENT ON LOWER WITH SLIGHT LATERAL DISPLACEMENT. SEE TEXT.

Thus it will be seen that supination of the upper radial fragment was present in thirteen out of thirty-two cases of fracture of the radius alone or of both bones of the forearm. On examining the table further it is found that of the thirteen bones which showed faulty rotation seven were broken above the end of the pronator teres muscle, five below it and one in the exact center of the shaft and hence among the fibres of the tendinous insertion of the same muscle.

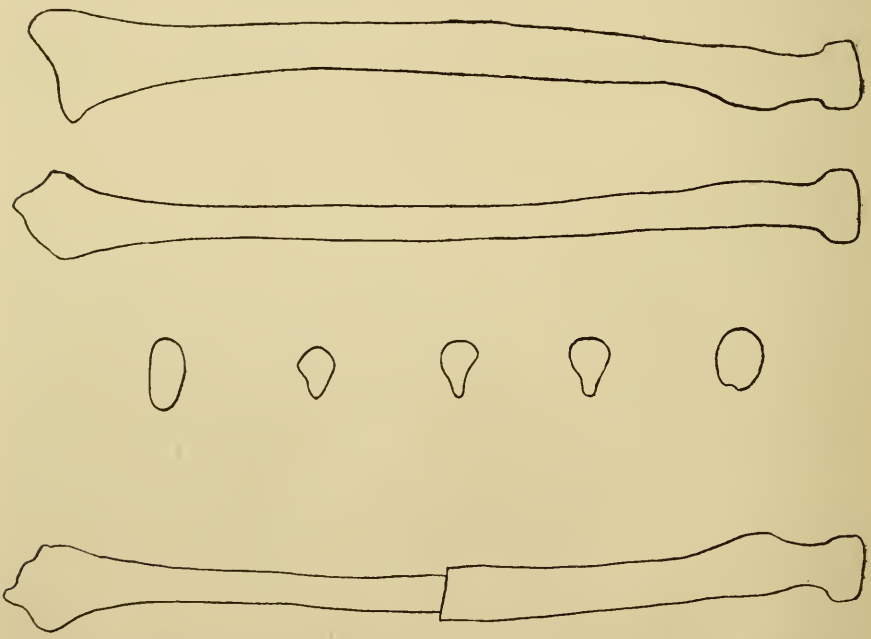
Up to the present time the only reported cases in which faulty rotation of the upper radial fragment could be demonstrated to the eye have been those of specimens from the cadaver. Yet it is quite possible by the suitable use of skiagrams to demonstrate this supination of the upper fragment. Not only may rotation of a fragment of the radius be thus made evident but the shafts of other long bones may be

8. FRACTURE OF HUMERUS. SHOWS OVERLAPPING AND ROTATION OF FRAGMENTS ON EACH OTHER. SEE TEXT.

examined in the same manner. Figure 8 shows rotation of the fragments of the humerus and a similar condition may often be demonstrated in other long bone fractures. The method depends upon the fact that the shaft of the radius (or in fact any other long bone) is not truly cylindrical. The radius is flattened from before backward and has a projecting inner border through the greater part of its length. Thus its diameter from side to side is considerably greater than is its antero-posterior, at any point between the bicipital tuberosity and its lower end. (Fig. 9.)

In the case of infants the cross section of the shaft of the radius is much more nearly circular and hence it is not easy to demonstrate rotation in patients under three years of age.

A pair of draughtman's compasses or fine calipers are used to measure the diameter of the upper and lower fragments of the fractured radial or other shaft as closely as possible to the point of fracture, as shown in the skiagram. Differences of diameter not grossly apparent to the unaided eye are made readily evident in this manner and when found they betoken the twisting of



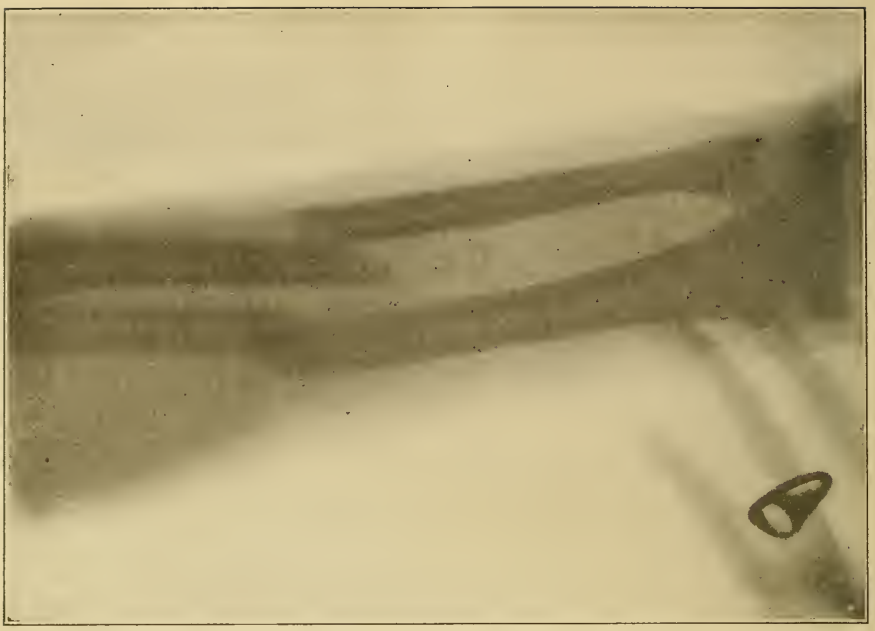
9. OUTLINE OF RADIUS; ANTERO-POSTERIOR AND LATERAL VIEWS. NOTE DIFFERENCE IN WIDTH THROUGHOUT SHAFT. ALSO CROSS SECTIONS AT VARIOUS LEVELS.

one fragment upon the other. If one fragment be displaced so as to lie much nearer the sensitive plate than the other its diameter will of course appear smaller, since the angle subtended with the point of origin of the Röntgen rays will be less, but where it is suspected that such a circumstance might mislead it is easy to verify or disprove the correctness of the observation by apply-

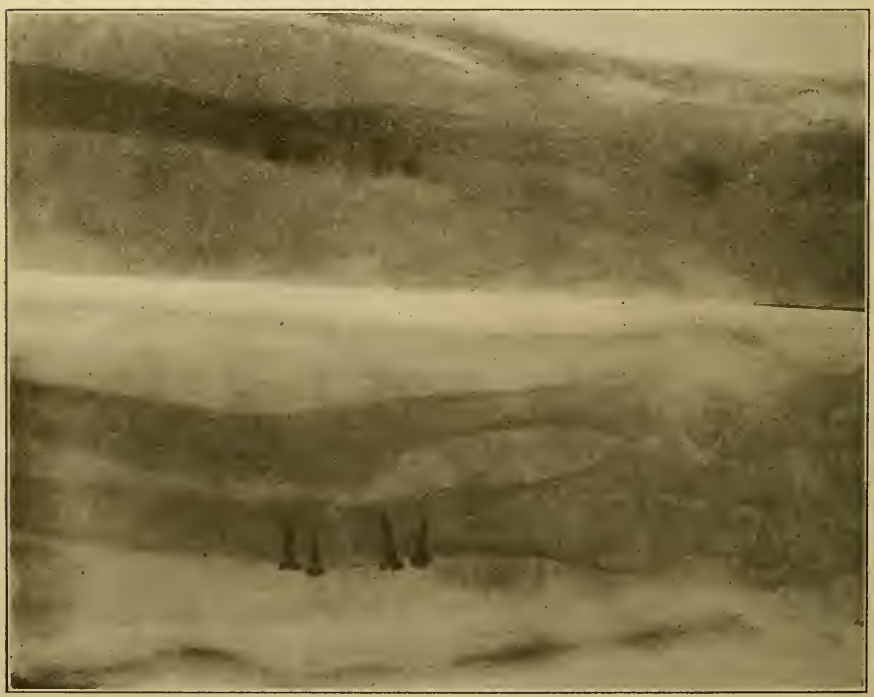
ing the measurement as well to another skiagram taken at right angles to the point of view of the first. Both antero-posterior and lateral aspects of the fragments under examination should agree in showing rotation before it can be said surely to exist. If the broken end of the rotated upper fragment appears broader than the lower in one skiagram it will appear narrower when in another taken at right angles to it. If the skiagram be taken from before backward with the forearm in supination, a fractured lower fragment will appear broader on the negative than the upper one. (Figs. 7 and 10.) The narrowing of the lower fragment in Fig. 11 as compared to the upper is due to the fact that the skiagram was made with the forearm between pronation and supination so that the said lower fragment is turned partly to show its narrower diameter. The supinated upper fragment shows the lateral or larger diameter. In this patient, a mechanic, fracture of both bones had been treated by the family physician in plaster splints with the hand prone. The forearm was fixed almost prone and the hand was useless for the purpose of earning his living at his trade.

That two skiagrams at right angles to each other should be taken of every fracture is generally admitted. To illustrate the importance of this point attention is called to Figure 12 in which an antero-posterior view might easily be thought to show nothing abnormal while the lateral view displays fracture of both bones with angular deformity.

Lonsdale[4], Callender[3], Flower and Hulke[6], and Agnew[7], after examination of museum specimens of united fractures of radial shafts, have found the lower fragment to be frequently much less supinated than the upper. Callender, whose material was derived from the hospital museums of London, wrote in 1865: "In eighteen specimens of fracture its (Radius') shaft, . . . there are but three in which good union has resulted. The fault . . . is invariably that the upper fragment has been allowed to rotate on its long axis." The present writer has seen a considerable percentage of cases of fractures of the shafts of both bones and of the radius alone followed after union has occurred by more or less loss of supination. It is evidently true that the end results generally in these cases have been far from satisfactory. The complacent attitude of those who claim uniformly good results from treatment by any routine method is hardly



10. FRACTURE OF BOTH BONES. APPROXIMATION OF BONES ABOVE FRACTURE. ALSO SHOWS FAULTY ROTATION OF UPPER RADIAL FRAGMENT. SEE TEXT.



11. OLD FRACTURE OF BOTH BONES, WITH FIBROUS UNION OF RADIUS AND BONY UNION OF ULNA IN POOR POSITION. FAULTY ROTATION OF UPPER RADIAL FRAGMENT. KINDNESS OF DR. R. ABBE.

12. FRACTURE OF BOTH BONES. LATERAL VIEW THE ONLY ONE TO SHOW ANGULAR DEFORMITY.

justifiable in the writer's humble opinion. Recollections of results in the past and general impressions unaided by carefully compiled reviews are apt to be misleading. No doubt a candid analysis of end results in these cases treated according to any routine method would show a considerable percentage of patients left with impaired supination of the hand. The treatment should be varied, according to the individual requirements. The day of routine practice in the man-

13. OLD FRACTURE OF BOTH BONES WITH REFRACTURE OF ULNA THROUGH CALLUS.

agement of fractures is past as much as it is in the case of any other ailments. Where the X-ray is accessible, every patient with a fractured bone is entitled to its aid in the determining upon proper treatment by the surgeon. The answer to the question of the advisability of operation will depend, as it always has, upon his individual training and judgment. Some will always operate where others will not, but the present tendency seems to be to extend the sphere of the open operation and there seem to be special inducements to operate in certain cases of fracture of the shafts of the bones of the forearm. The general practice of operating upon simple fractures where good apposition of the fragments can be maintained

by indirect splints is probably upheld by no one. Nor would it be easy to find surgeons who would deny the wisdom of resorting to open operation in cases of severe deformity with disability or of non-union of fragments due to interposed soft parts. But the field for controversy, includes those cases where overlapping, angular deformity or long delayed union make the end result a matter of doubt. Surprisingly good results have been associated with marked deformities in the skiagram, it cannot be denied. Arguments for and against the

14. NON-UNION OF ULNA DUE TO INTERPOSITION OF SOFT PARTS.

operative treatment of fractures are actively exchanged by their respective adherents, and surgeons whose opinions command respect are arrayed on both sides of the question. Among the disadvantages attending open operations the following are cited:

The amount of trauma necessary, especially to periosteum with attendant delayed union.

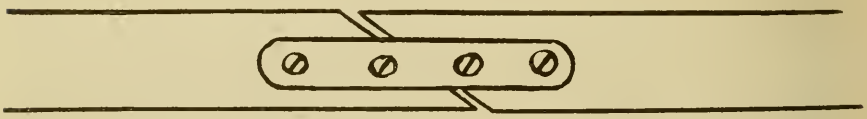
Liability to infection.

Frequent breaking of the suture.

Impossibility of maintaining good position of the fragments.

The use of direct or so-called internal splints of metal will, it is believed, deprive the reasons against operation above mentioned of much of their weight if the circumstances of the case in question permit of their use. By means of aluminum plates and steel screws the fragments are held firmly in position and displacements are prevented whether they be of lateral, angular or torsion type, in a manner not to be expected of a wire or other suture or even several of them.

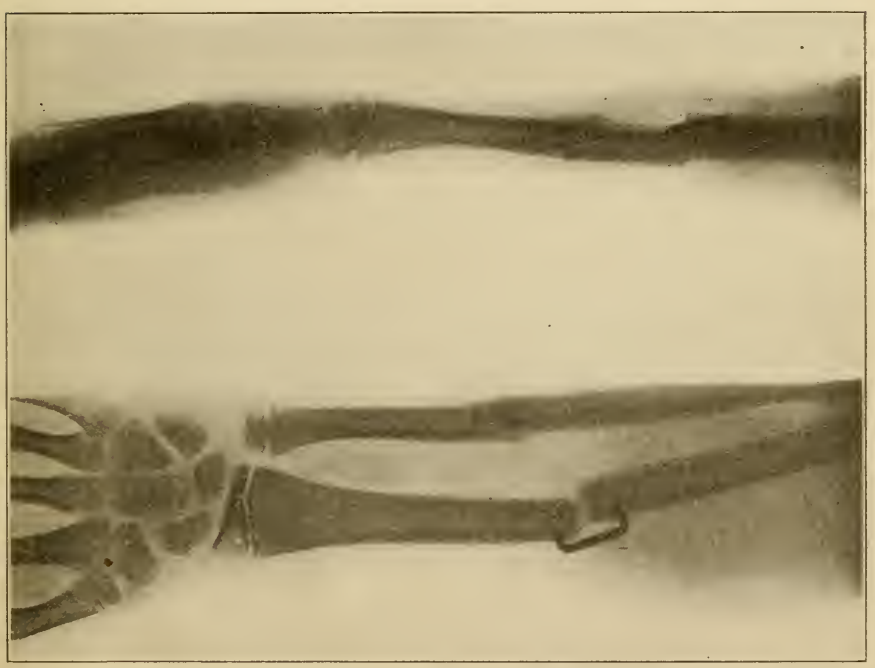
In the case of simple fractures of the shafts of both bones of the forearm or that of the radius alone, the procedure is as follows: After reduction of any apparent displacement by careful manipulation the fragments are immobilized in the semi-prone position in flat, well-padded antero-posterior splints a little wider than the forearm



15. DIAGRAM SHOWING ALUMINUM CLEAT SCREWED TO OBLIQUELY FRACTURED BONE.

and extending from the elbow to the knuckles. It is especially important to pad the splints well at the lower part of the forearm to avoid harmful pressure on the vessels and median nerve. Frequent adjustments may be needed for a few days in order to avoid obstruction to the circulation and to tighten the strapping and bandage as swelling, if present, diminishes. In case there has been no swelling and no deformity, plaster of Paris moulded splints are employed. Skiagrams are then made, one with the hand semi-prone, its anterior surface toward the sensitive plate; the other with the hand also semi-prone but with the ulnar surface toward the plate. In this one the radius and ulna should not be quite in line with each other and with the point of origin of the X-rays. In other words, the shadows of the two bones should not overlap and obscure each other on the plate. If careful examination of the skiagram in the manner described above shows good position of the bones with no faulty rotation of the upper radial fragment, no change in treatment is necessary. In the series of

cases under consideration, one or both bones were refractured (Fig. 13) in no less than six instances, or twelve per cent. of all. Whether this high proportion be exceptional or not it calls for consideration in the planning of treatment. Most of these patients are young and heedless and some form of splint should be continued until the greatest likelihood of refracture is past. Union in faulty position may play its part as a factor in causing such a frequent occurrence of this mishap. If so an argument is added in favor of accurate replacement of the fragments such as is frequently possible only by means of the open operation and direct splinting.

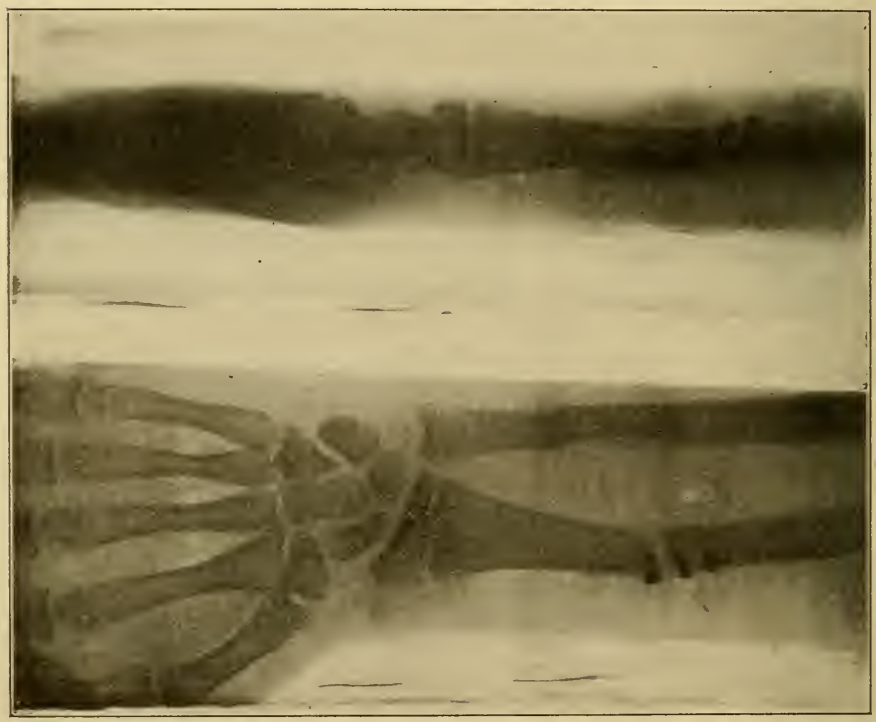


16. FRACTURE OF BOTH BONES. GERMAN SILVER STAPLE IN RADIUS HAS THE DISADVANTAGE OF ALLOWING HINGE MOTION BETWEEN FRAGMENTS.

If after reduction the position of the fragments is satisfactory and there is no tendency to recurrence of deformity, massage is begun by one skilled in its use, within eight or ten days after reduction. At first the manipulation is confined to effleurage while the forearm rests

upon the cautiously opened splint. Later, when union is well under way, the forearm is removed from the splint during more thorough massage. The benefit of massage in promoting the absorption of swelling, hastening union and a resumption of use of the member is very great here as in the case of other fractures.[8]

If the skiagrams after the first reduction show malposition of the fragments, whether it be angular deformity, overlapping or faulty



17. FRACTURE OF BOTH BONES. SAME CASE AS SHOWN IN FIG. 1. ALUMINUM CLEAT (TRANSPARENT TO X-RAYS) HELD IN PLACE BY STEEL SCREWS.

rotation further attempts at reduction are made, under nitrous oxide anæsthesia and the result ascertained by further use of the X-ray. If faulty rotation be present the forearm is immobilized in full supination, with an angular splint extending well up the arm and down to the knuckles with the elbow flexed to a right angle.

If abnormal approximation of radius and ulna be present it is im-

possible to overcome it by the use of any so-called interosseous pads. Complete rotation of the radius depends upon an interosseous space of normal width. If, therefore, radius and ulna are approximated so that rotation is to be prevented after union, an open operation will afford the best prospects for regaining that function.

To recapitulate, the indications for direct splinting by open operation are considered to be the following:

Persistent overlapping of fragments, or other marked irreducible displacement. (Fig. 1.)

Non-union due to interposed tissue or other cause. (Fig. 14.)

Marked angular deformity. (Fig. 6.)

Faulty rotation of the upper radial fragment which cannot be kept reduced in the ordinary indirect splints. (Fig. 7.)

Old fractures with malunion and disability. (Fig. 11.)

Approximation of radius and ulna. (Narrowing of interosseous space.) (Figs. 2, 5 and 10.)

W. Arbuthnot Lane[9], E. M. Corner[10] and other English surgeons have employed steel plates held by screws in the fragments in repairing fractures. C. A. Elsberg[11] in New York has experimented with aluminum tubes which are fitted into the medullary cavity of long bones at the site of fracture. Watson Cheyne[12] uses collars of aluminum partly encircling the fragments at the seat of fracture and retained by steel screws.

Aluminum seems to be well adapted for use as direct splints. It furnishes good material for plates or cleats described below. It is easily cut by scissors or drilled through by any sharp-pointed steel instrument, and yet is strong enough to hold the fragments of bone firmly in place even when there is a strong tendency to their displacement.

In using an aluminum cleat (Figs. 15 and 17) for the repair of the fractured shaft of radius or ulna, plate metal of a thickness of 21 or 23 Stubb's gauge is selected. A suitable size for the cleat in the case of a patient fifteen years old would be about ¼ inch wide by 1½ inches long. It is curved from side to side so as to fit snugly against the bone.

The incision is made long enough to expose an inch or more of each fragment. The ulna being superficial throughout its length is easily accessible with the forearm prone upon a sandbag at the patient's side

as he lies supine. The radius is reached most readily at its outer and posterior aspect. Its fragments should be secured together while the hand is fully supinated. But in order to work upon this bone in supination it must either be attacked from its anterior surface, or else if the incision be posterior it will be necessary to extend the extremtiy above the patient's head with the forearm resting upon a separate table. In this position supination brings the dorsal surface uppermost.

Unnecessary traumatism is studiously avoided throughout the operation. Nor is much traumatism called for. To be sure when sutures are employed it is necessary to expose the fragments completely in order to transfix them with the drill and to pass the suture material from both sides. With the cleats, however, the technic is more simple and requires exposure of but one aspect of the bone, namely that nearest to the operator. Each fragment in turn is held up in the wound by a narrow periosteal elevator or stout blunt hook slipped under and in close contact with it, while the end is trimmed with rongeur or wire saw or cutting forceps. Especial effort is made to preserve intact all periosteum. An assistant steadies the fragment while the operator drills the holes with an instrument a trifle smaller than the screw to be introduced. The screws are of nickel plated or plain steel with round heads, and several lengths are at hand to choose from. Screws penetrate only partly through the shaft of the bone if the fragments are easily retained in good apposition, but if more strength is required the points rest in the dense structure at the farther side of the bone.

The length of screws most used are three-eighths and five-eighths of an inch. The screws are placed as near the ends of the fragments as is compatible with security. If but one screw be placed on each side of the fracture a certain amount of hinge movement may occur between the fragments and hence two screws should be inserted on at least one side of the fracture. If this procedure be followed no displacement is possible, whereas with either sutures, (Fig. 6) staples (Fig. 16) or even plates with but one screw on each side of the fracture rigidity cannot be maintained. Especially is it desirable to maintain this rigidity when the tendency is for the upper radial fragment to rotate upon its long axis and in such cases no amount of suturing will suffice.

In time the screws work loose but not enough to allow of serious displacement.

In cases in which the fracture is oblique the screws are placed so that each will transfix one fragment only. (Fig. 15.)

As soon as one hole is drilled the cleat is placed and the screw is immediately driven. Thus the cleat with its other holes remains as a guide in placing the subsequent drill holes.

The wound is closed after especial attention has been given to the avoidance of hematoma. The usual outer splints are employed after the operation. In all cases, either operative or simple massage is begun early and as in the case of other fractures is of the greatest assistance in hastening a good functional result.

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